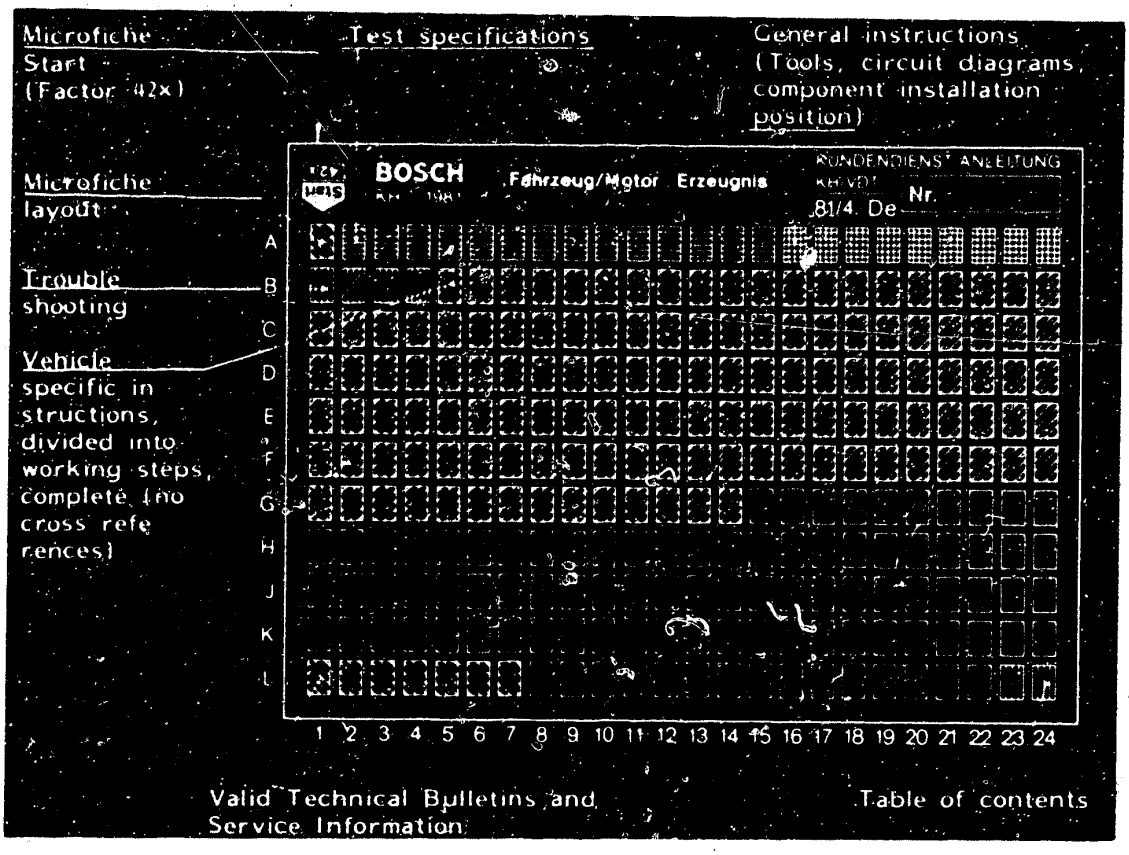
Microfiche layout



1. Read from left to right

2. Title of microfiche (appears on each coordinate)

E16	Product/assembly/test step Vehicle/engine	

Coordinate

3. Limits of section

Beginning	Mid-section	End	One-page section
➡	⬅➡	⬅	➡⬅

4. Purely vehicle-specific passages in the text are marked with a vertical bar.

5. Reference to relevant working steps in the test specifications, e.g. coordinate C6.

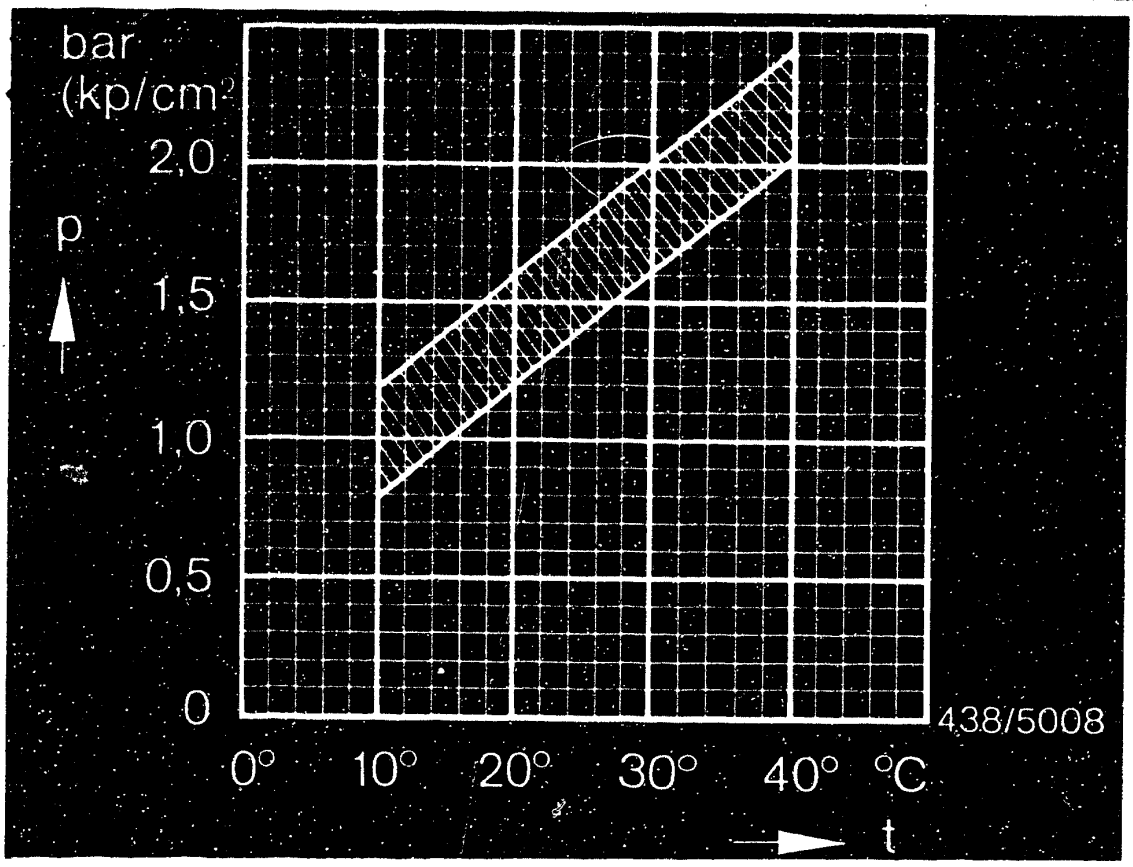
C6

1. Test specifications

1.1 Electric fuel pump

B 22

Test step	Test specifications
Fuel delivery:	
3.5 l, 3.8 l engine	min. 1000 cm^3/30 s
4.5 l, 5.0 l engine	min. 1100 cm^3/30 s



p = control pressure (gauge pressure)
t = ambient temperature

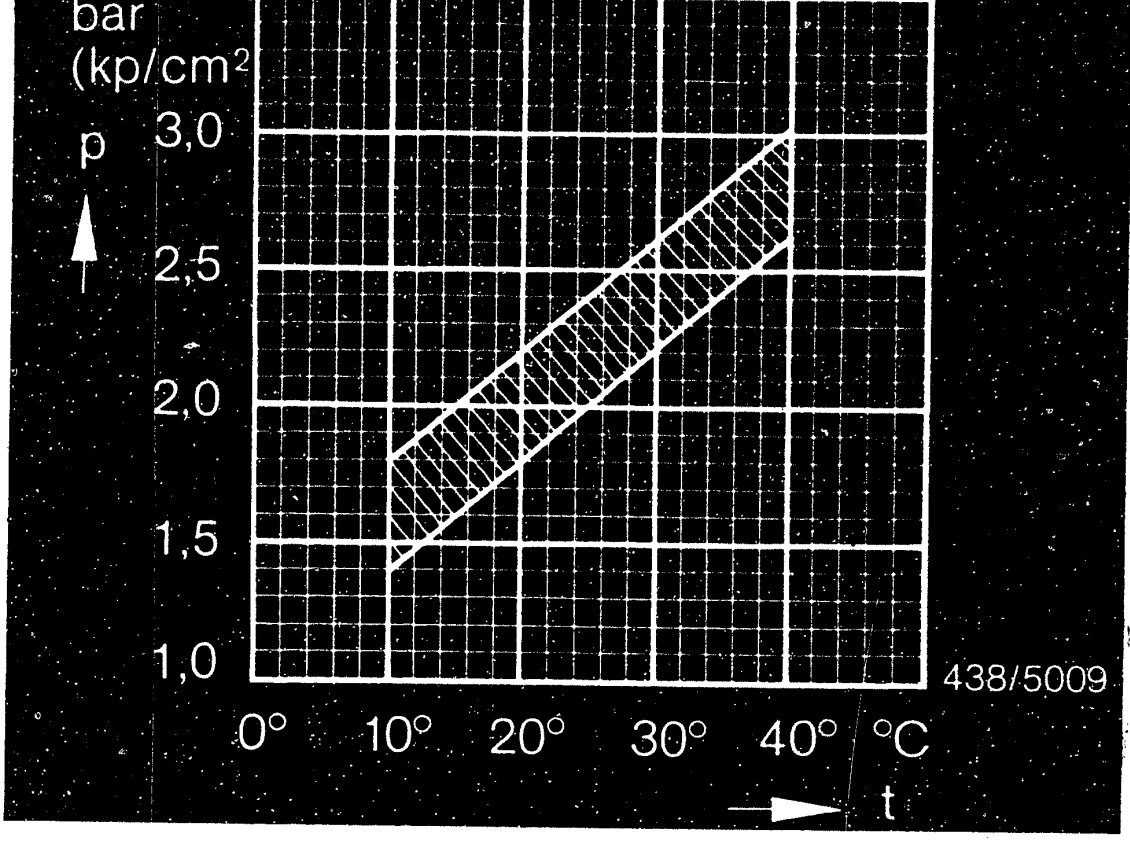
1.2 Control pressure "cold"

C7

Warm-up regulator 0 438 140 056
(Version for full-load enrichment)

For testing, connect vacuum pump to intake-manifold-pressure connection of warm-up regulator.

Setting value: 510...550 mbar
(385...415 torr)



p = control pressure (gauge pressure)
t = ambient temperature

Control pressure "cold"

C7

Warm-up regulator 0 438 140 068
(version for acceleration enrichment)

Test with engine stopped, i.e. without intake-manifold pressure.

Test step	Test specifications*

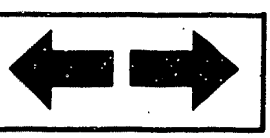
C7

1.3 Control pressure "warm"

- Warm-up regulator 0 438 140 056
  (version for full-load enrichment)

Test at atmospheric pressure (without vacuum)	
up to FD 930	2.8...3.2 bar (2.9...3.3 kgf/cm²)
as of FD 931	2.6...3.0 bar (2.7...3.1 kgf/cm²)
For testing, connect vacuum pump to intake-manifold-pressure connection of warm-up regulator.	
Setting value:	
510...550 mbar (385...415 torr)	3.4...3.8 bar (3.5...3.9 kgf/cm²)
Leak test on full-load diaphragm	
Maximum permissible pressure change from "setting value"	100 mbar (75 torr)/15 s

* Pressures in the test-specification table are given in bar (gauge pressure) and kgf/cm² (gauge pressure).



Test step	Test specifications*

C7

1.3 Control pressure "warm"

- Warm-up regulator 0 438 140 068
  (version for acceleration enrichment)

Test with engine stopped, i.e. without intake-manifold pressure.	3.4...3.8 bar (3.5...3.9 kgf/cm²)
Connect vacuum pump to intake-manifold-pressure connection of lower chamber.	
Setting value: 450...550 mbar (340...415 torr)	1.4...1.8 bar (1.5...1.9 kgf/cm²)
Leak test on both chambers:	
Maximum permissible pressure change from "setting value"	100 mbar (75 torr)/15 s

* Pressures in the test-specification table are given in bar (gauge pressure) and in kgf/cm² (gauge pressure).

Test step		Test specifications

1.4 Primary pressure

D 11

Fuel distributor		
0 438 100 041 0 438 100 068 0 438 100 087	Checking value	4.7...5.4 bar (4.8...5.5 kgf/cm²)
0 438 100 088 0 438 100 089	Setting value	4.9...5.1 bar (5.0...5.2 kgf/cm²)
Fuel distributor		
0 438 100 012	Checking value	5.0...5.6 bar (5.1...5.7 kgf/cm²)
0 438 100 034	Setting value	5.2...5.4 bar (5.3...5.5 kgf/cm²)

1.5 Leak test

D 18

Minimum pressure	
after 10 minutes:	2.7 bar (2.8 kgf/cm²)
after 20 minutes:	2.6 bar (2.7 kgf/cm²)

* Pressures in the test-specification table are given in bar (gauge pressure) and in kgf/cm² (gauge pressure).

Test step	Test specifications
1.6 Injection valves 0 437 502 010 Opening pressure:	3.0...4.1 bar (3.1...4.2 kgf/cm²)

E16

1.7 Fuel distributor

F3

Delivered-quantity comparison:	Setting point	Max. allowable delivery
	cm³/min	cm³/min
Idle	6.0	6.8
Part load	30.0	34.0
Full load	100.0	110.0

1.8 Idle-speed adjustment

Note: Engine oil temp. approx. 80°C

F13

Idle speed	
350/380 (116 engine)	700...750 min^{-1}
450/500 (117 engine)	650...700 min^{-1}
CO concentration (% by vol.)	0.5...1.5 % by vol.

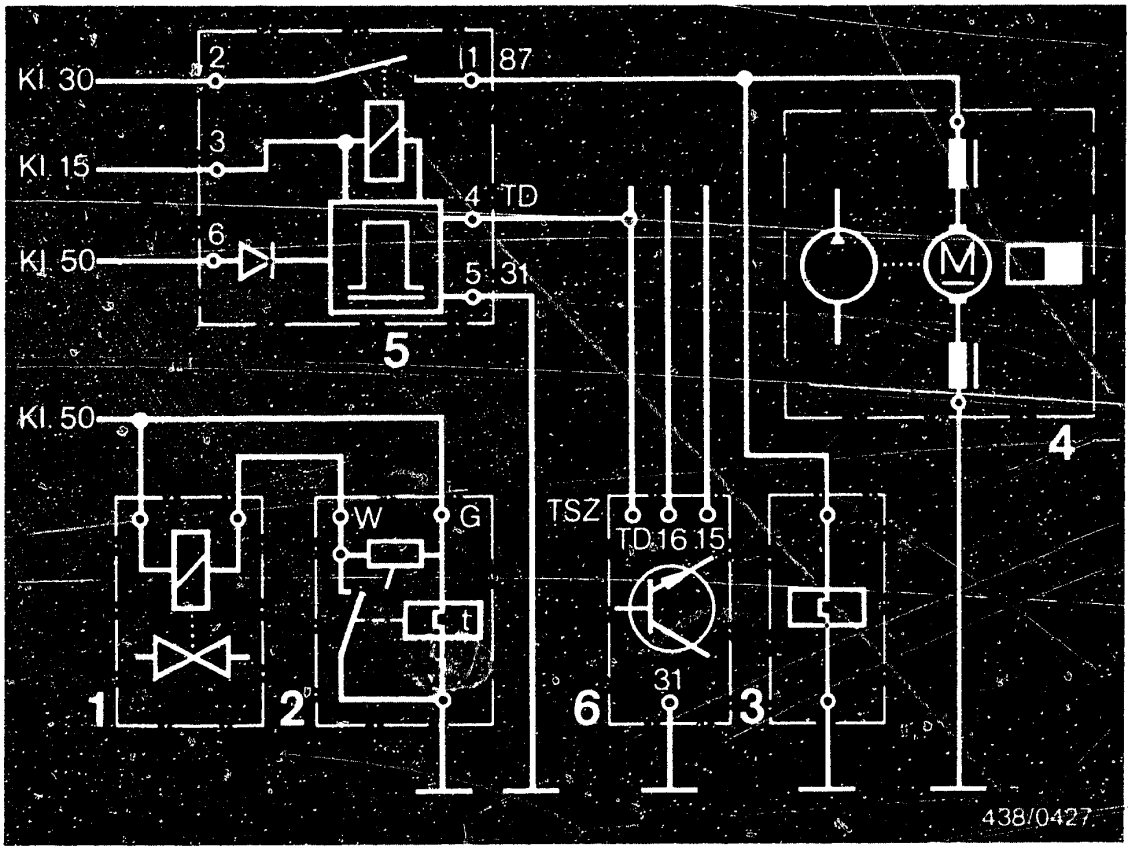
* Pressures in the test-specification table are given in bar (gauge pressure) and in kgf/cm² (gauge pressure).

2. Electrical safety circuit

The safety circuit employs an electronic relay which is triggered from terminal TD of the trigger box of the transistorized ignition system.

Additional function of the relay: Protection against overrevving
At an engine speed of (see below) the electric fuel pump is switched off in order to limit the engine speed.

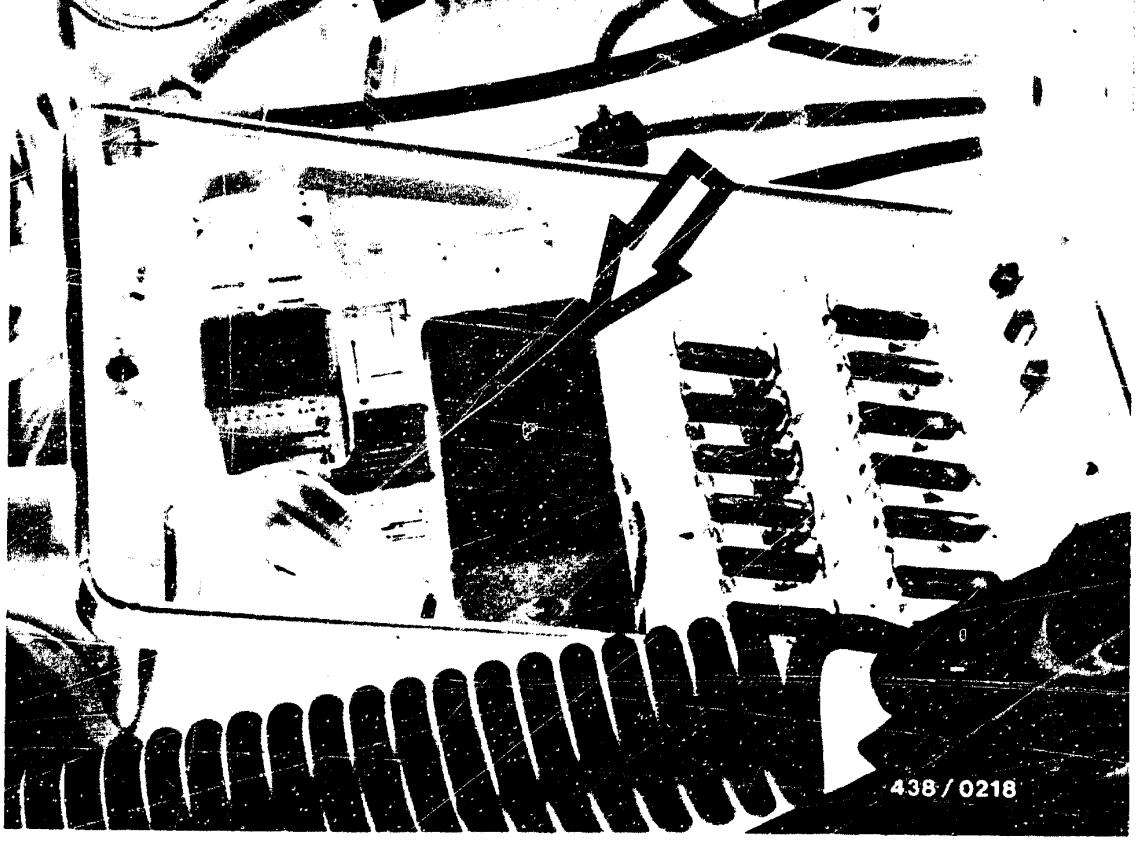
Model	Engine type	Cut-off speed
380	116.961	6600 $\pm$ 50 min^{-1}
500	117.961	5950 $\pm$ 50 min^{-1}



2.1 Circuit diagram

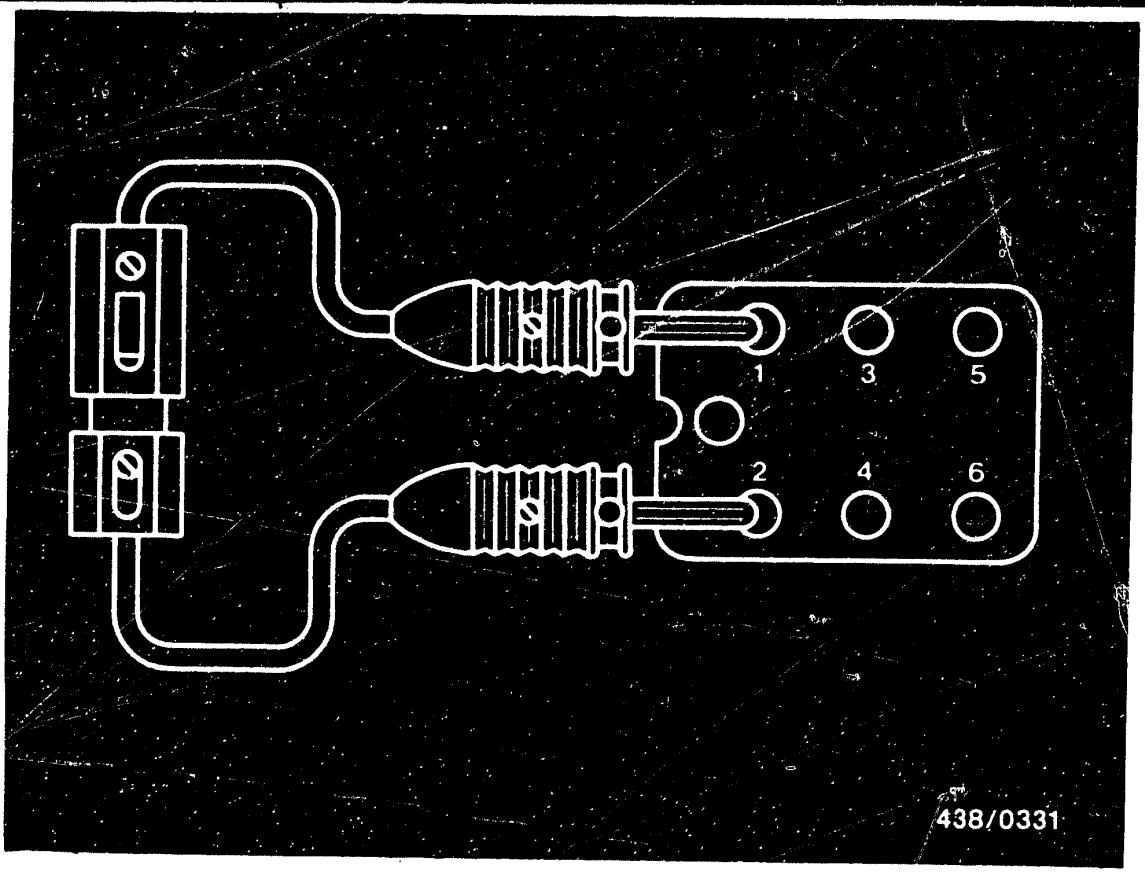
1 = Start valve
2 = Thermo-time switch
3 = Warm-up regulator
4 = Electric fuel pump
5 = Electronic relay
6 = Trigger box of transistorized ignition system (TCI)

Kl. = Terminal
TSZ = TCI

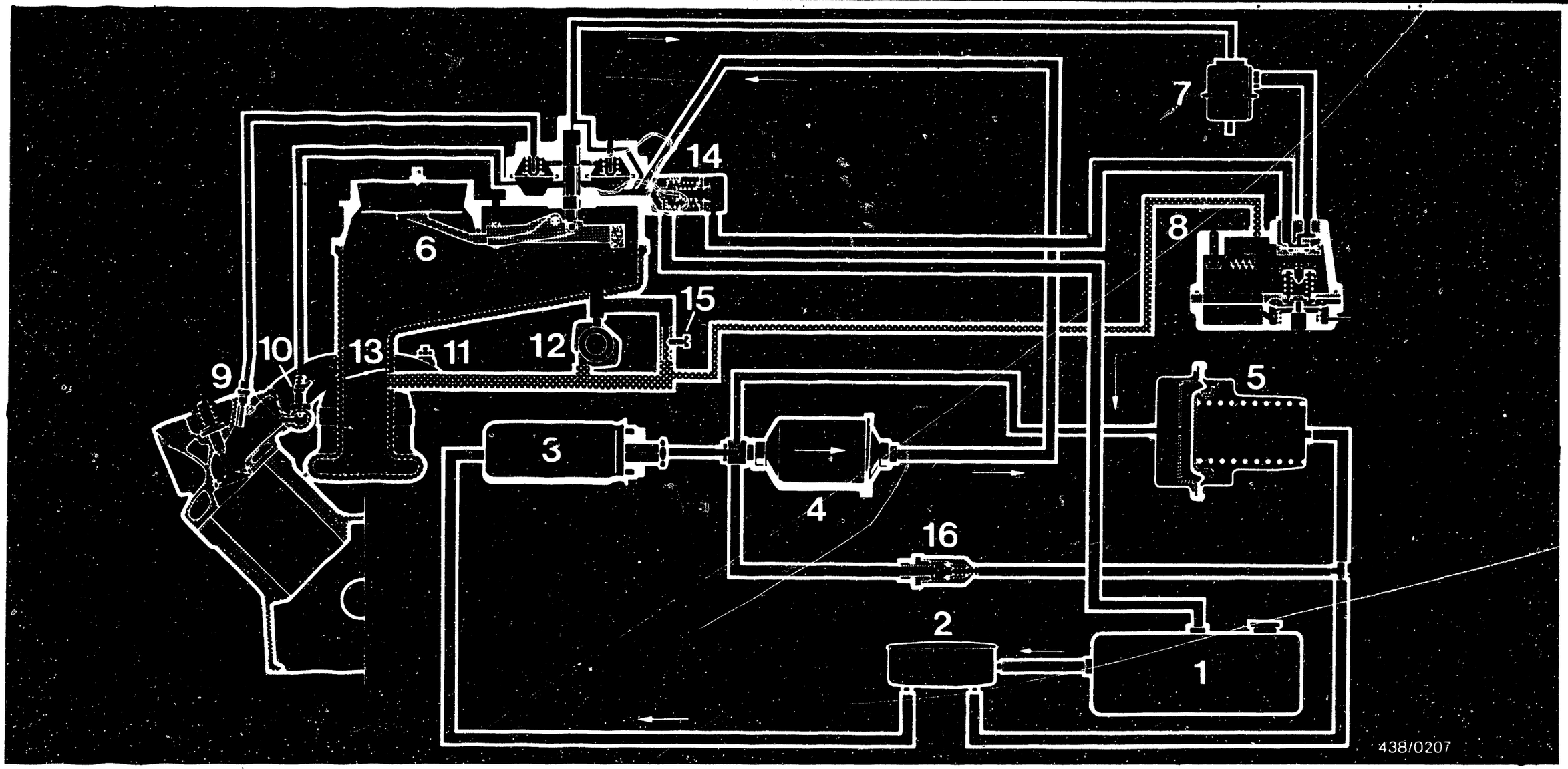


2.2 Bridging the safety circuit

In order to carry out testing with the engine stationary, it is necessary to bridge the safety circuit.
To do this, pull the electronic relay (arrow) out of its base. It is positioned on the left-hand side in front of the firewall (when viewed from behind the vehicle).



Connect sockets 1 (87) and 2 (30) in the base.
Use connecting cable 1.5 mm² with fuse holder and 16 A fuse (to be user-fabricated according to sketch).
Electric fuel pump, warm-up regulator and auxiliary-air device are now supplied with battery voltage.



3. Diagram of fuel lines

1 = Fuel tank
2 = Intake-noise damper
3 = Electric fuel pump
4 = Fuel filter
5 = Fuel accumulator
6 = Mixture-control unit with downdraft air-flow sensor
7 = Fuel-line-pressure damper
8 = Warm-up regulator
9 = Injection valve
10 = Start valve
11 = Thermo-time switch
12 = Auxiliary-air device
13 = Throttle valve
14 = Primary-pressure regulator with push valve
15 = Idle-speed-adjusting screw (bypass)
16 = Pressure-relief valve

▒ = Intake-manifold-pressure lines
□ = Fuel lines

4. General information

4.1 Introduction

As from the 1979 model the following vehicles are supplied with an 8-cylinder engine with K-Jetronic:

Model	Vehicle type	Engine type
350 SL, SLC	107...	116...
350 SE, SEL	116...	116...
380 SE, SEL	126... as from 1980	116...
450 SL, SLC, SLC 5.0	107...	117...
450 SE, SEL	116...	117...
500 SE, SEL	126... as from 1980	117...

This repair manual refers only to the above-mentioned vehicles and gives a concise description of the testing and adjustment operations to be performed on the vehicle on the K-Jetronic.

All the system components are dealt with in separate working steps with the corresponding test specifications.
In addition to this repair manual the appropriate testing and repair manuals will, of course, be issued for every other vehicle type equipped with the K-Jetronic.

The K-Jetronic differs from other known fuel-injection systems in terms of both construction and operation. In order to be able to carry out the testing procedures described in this manual - and therefore to be able to assess the components - the K-Jetronic and its operation should be clearly understood. The essential points of the operation and construction of the K-Jetronic are described in Technical Instruction VDT-U 3/1 En.

4.2 Design

The entire system of the K-Jetronic in these vehicle types corresponds, with the exception of the differences listed below, to the basic design.

4.3 Differences:

- Air-flow sensor in downdraft design.
- As from the 1980 model, fuel distributors with adjustable differential-pressure valves are installed. In this type of fuel distributor, screw plugs are situated adjacent to the fittings for the fuel-injection lines.

This possibility for adjustment has only been introduced for production at the works. This does not result in any additional adjustment possibilities for the After-Sales Service Organization.

For this reason, the fuel distributor is to be dealt with in precisely the same manner as the conventional model. The screw plugs must not be removed or loosened.

• As of the 1980 model a separate pressure-relief valve is installed between the fuel accumulator and the fuel filter inlet.
At below 0.3 bar gauge pressure in the inlet this valve opens, as a result of which the gauge pressure drops to 0 bar.
In this way, the control plunger in the fuel distributor is prevented from being possibly sucked upwards as the engine cools down.
In addition, a helical compression spring is fitted above the control plunger. As of the 1981 model the pressure-relief valve is integral with the fuel distributor (on the control-pressure dome).

• Fuel-line-pressure damper in the control-pressure line between fuel distributor and warm-up regulator.

• Warm-up regulator for manifold-pressure dependent full-load enrichment.

• Auxiliary-air device with coolant-controlled expansion element.

• Intake-noise damper in the fuel intake line (in order to prevent intake noises) between the fuel tank and the electric fuel pump (not a Bosch product).

- Electric fuel pump with replaceable non-return valve.

- Fuel accumulator with doubled storage volume (40 cm^3) and only one connection on accumulator end.
The spring chamber is not vented to atmosphere, but instead is connected to the fuel intake line by means of a hose line leading to the intake-noise damper.

- Electrical safety circuit for electric fuel pump and warm-up regulator by means of electronic relay.
Due to this safety circuit the components are not supplied with power until the engine is being started, so that, with only the ignition switched on, the electric fuel pump cannot operate and the warm-up regulator cannot shut off prematurely.

- Engine-speed limitation (protection against over-revving):
At a given engine speed (see below) the electric fuel pump is switched off in order to limit the engine speed.

Model	Engine type	Cutout speed
380	116.961	6600 ± 50 min^{-1}
500	117.961	5950 ± 50 min^{-1}

5. Test equipment and tools

5.1 Pressure tester KDJE-P100 (previously KDEP-1034)

For testing all fuel pressures and testing for leaks.

5.2 Connecting-parts set KDJE-P100/11 (previously KDEP 1034/11)

For connecting pressure tester KDJE-P100 (previously KDEP 1034) to the control-pressure port of the fuel distributor.

5.3 Adjusting wrench KDEP 1035

For adjusting the idle-mixture-adjusting screw in the mixture-control unit (idle-speed/CO adjustment).

5.4 Guide ring KDEP 1040/14 (dia. 110 mm)

For centering the air-flow sensor plate in the air-flow sensor.

5.5 Tester for delivered quantity comparison KDJE-P200 (previously KDJE 7451)

For comparing the fuel delivered from the individual fuel-distributor outlets.

5.6 Line set KDJE-P200/25 (previously KDJE 7451/25)

For connecting the tester for delivered quantity comparison to the K-Jetronic system with steel fuel-injection tubing.

5.7 Electrical connection cable (test line)

KDJE 7450/70 for direct connection of components to be tested, e.g. the cold start valve.

5.8 Graduate (commercially available, capacity approx. 1.5 l)

For measuring the delivery of the electric fuel pump.

5.9 Valve tester KDJE-P400 (previously KDJE-7452).

For testing the injection valves.

Test media: Calibrating fluid (Shell K30, Esso-Varsol, Shell Mineral Spirits 135).
or
Bosch Part No. VS 14 942-CH
Former Part No. 5 973 340 650
The calibrating fluid can be obtained in 5 l metal cans from the following supplier:
Firma
Oskar Gnamm GmbH & Co
D-7531 Kämpfelbach-Bilfingen

Caution:
For safety reasons, never use gasoline or similar easily inflammable and combustible liquids.
Even with calibrating fluid, be sure to observe the local official regulations.

5.10 Tachometer (commercially available)

For idle-speed adjustment.

5.11 CO meter (commercially available)

For idle-speed CO adjustment.

5.12 Vacuum pump (commercially available)

For testing warm-up regulators with intake-manifold-pressure-dependent full-load enrichment.
e.g. hand vacuum pump "Mityvac" from
Korinth
Ludwig-Kloos-Straße 21
6450 Hanau 7 (Steinheim)

5.13 Setting device KDJE 7456

For deflecting the air-flow sensor plate (downdraft air-flow sensor) when comparing the fuel deliveries from the fuel-distributor outlets.

5.14 TORX offset wrench Size TX 730 (commercially available)

For screwing out the screw plug of the pressure-relief valve on the fuel distributor.

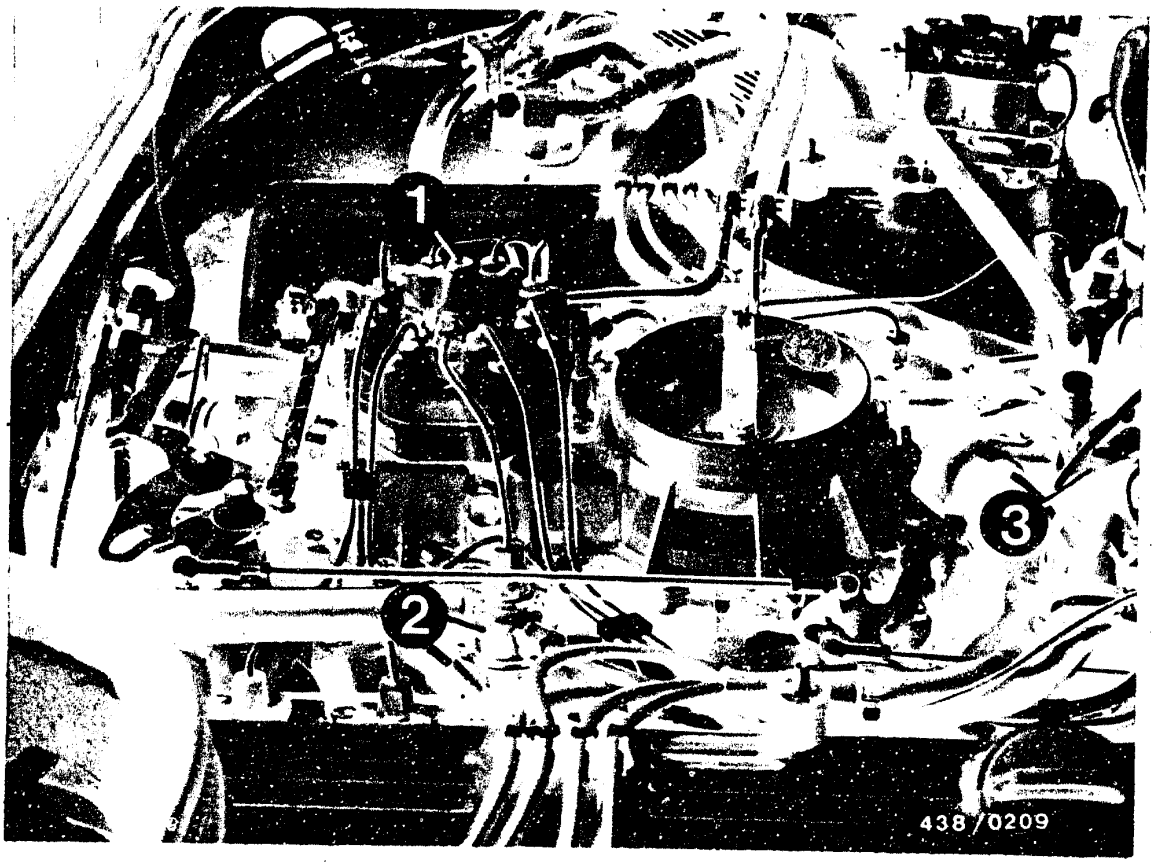
5.15 Tool set for removing and fitting the idle-speed anti-tamper device. (E.g. No. 4521/7 from Hazet Co., 5630 Remscheid).

1 = Mixture-control unit
2 = Injection valve(s)
3 = Start valve
4 = Thermo-time switch
5 = Warm-up regulator

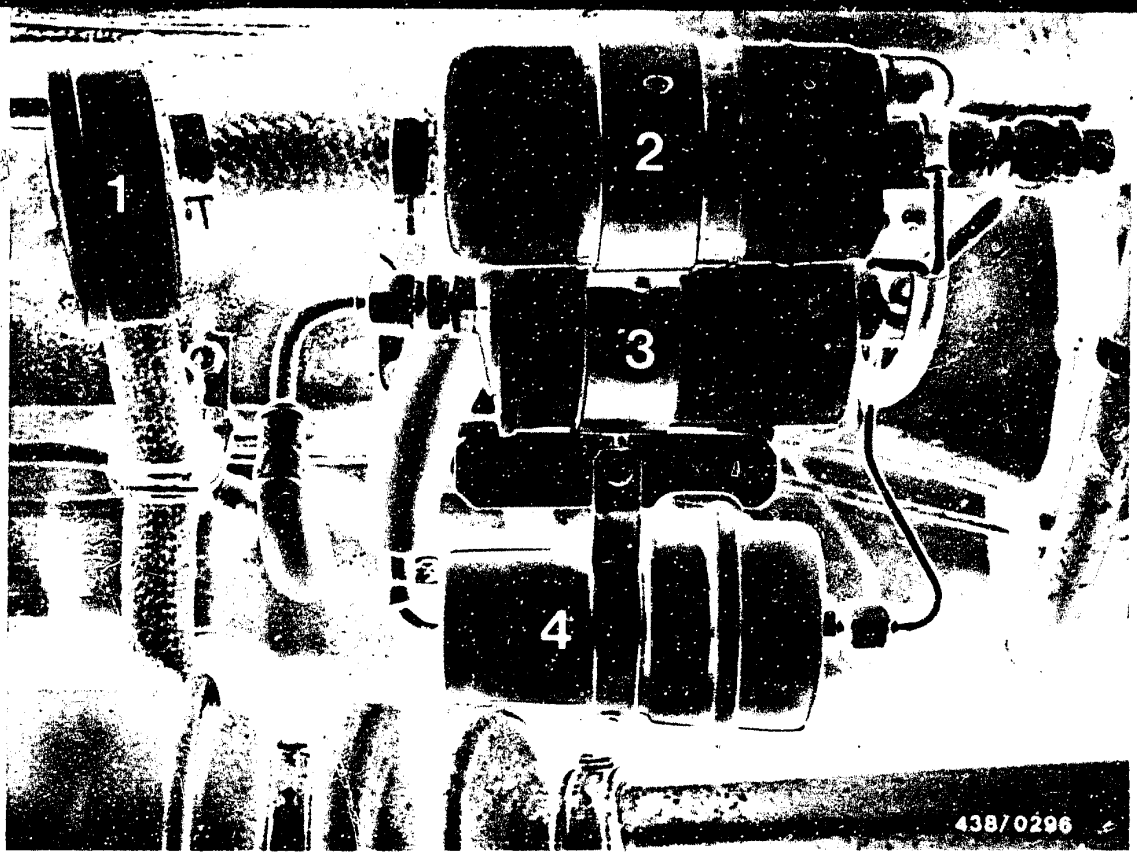
6. Installation position of individual components

6.1 Arrangement of components on the engine

(Air filter removed)



1 = Pressure-relief valve (integral with fuel distributor)
2 = Fuel-line-pressure damper
3 = Coolant-controlled auxiliary-air device



1 = Intake-noise damper
2 = Electric fuel pump
3 = Fuel filter
4 = Fuel accumulator

6.2 Fuel-supply components

Intake-noise damper (1), electric fuel pump (2), fuel filter (3) and fuel accumulator (4) are fastened on a support piece underneath the vehicle on the right-hand side above the rear axle.
The pressure-relief valve is positioned between the fuel filter and the fuel accumulator (hidden in the picture). These components are protected against road dirt by a dirt deflector (removed in the picture).
The connections of these components should be thoroughly cleaned before opening.

7. Trouble-shooting chart

Customer complaint (fault symptom)

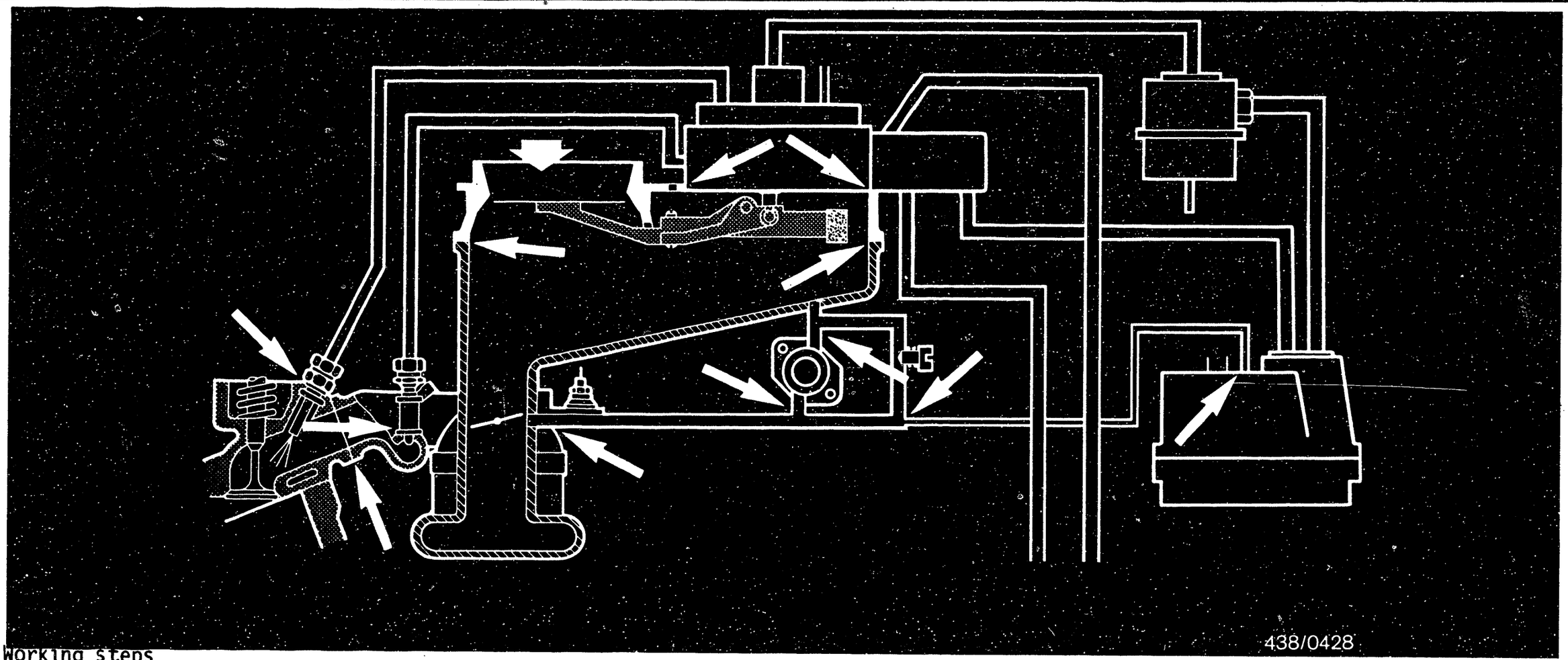
1. Engine does not start, or starts poorly, in cold condition
2. Engine does not start, or starts poorly, in warm condition*
3. Irregular idling during the warm-up phase (shakes)
4. Irregular idling with warm engine (shakes)
5. Engine does not draw gas, burbles
6. Engine misfires when operating on the road, high load
7. Insufficient power

*Note
If, in the case of Symptom 2, after checking and repairing all the fault causes listed below, the hot-start characteristic is still unsatisfactory this can be improved by fitting an impulse relay.
The fitting of this relay is described in Coordinate L 5.

1	2	3	4	5	6	7	Cause	Coordinates
	●	●	●	●		●	Vacuum system leaking	B 5
●	●		●	●	●	●	Air-flow sensor lever and/or control plunger not moving smoothly	B 7
	●						Position of the air-flow sensor plate incorrect	B 16
●		●					Auxiliary-air device does not open	B 21
●	●				●		Electric fuel pump not operating	B 22
●							Cold-start system defective	C 3
		●	●				Cold-start valve leaking	C 5
				●			Fuel delivery excessive for control-pressure circuit	C 8
●		●					"Cold" control pressure outside tolerance	C 7
	●		●	●	●	●	"Warm" control pressure too high (after warm-up)	C 7
			●	●		●	"Warm" control pressure too low (after warm-up)	C 7
					●	●	Primary (system) pressure outside tolerance	D 11
	●						Overall fuel system leaking	D 18
●	●	●	●		●		Injection valves leaking, opening pressure too low	E 16
●	●	●	●			●	Unequal fuel delivery (imbalance of fuel delivery)	F 3
●	●	●	●	●			Basic idle adjustment incorrect	F 13
						●	Throttle plate does not open completely	F 14

Customer complaint (fault symptom)

8. Engine runs on after being switched off ("diesels")	9. Fuel consumption too high	10. Flat spot during acceleration	11. CO concentration during idling too high	12. CO concentration during idling too low	13. Idle-speed cannot be adjusted (too high)	14. Engine starts but then immediately stops	Cause	Coordinates
		●		●			Vacuum system leaking	B 5
●		●	●	●			Air-flow sensor lever and/or control plunger not moving smoothly	B 7
●							Position of the air-flow sensor plate incorrect	B 16
							Auxiliary-air device does not open	B 21
					●		Auxiliary-air device does not close	B 22
						●	Electric fuel pump not operating	C 3
							Cold-start system defective	C 5
●	●		●				Cold-start valve leaking	C 8
		●				●	Fuel delivery excessive for control-pressure circuit	C 7
		●				●	"Warm" control pressure too high (after warm-up)	C 7
	●	●	●			●	"Warm" control pressure too low (after warm-up)	C 7
		●				●	Primary (system) pressure outside tolerance	D 11
							Overall fuel system leaking	D 18
●							Injection valves leaking, opening pressure too low	E 16
		●					Unequal fuel delivery (imbalance of fuel delivery)	F 3
●	●	●	●	●			Basic idle adjustment incorrect	F 13
							Throttle plate does not open completely	F 14



Working steps

8. Check the vacuum system (air-intake system) of the engine for leaks.

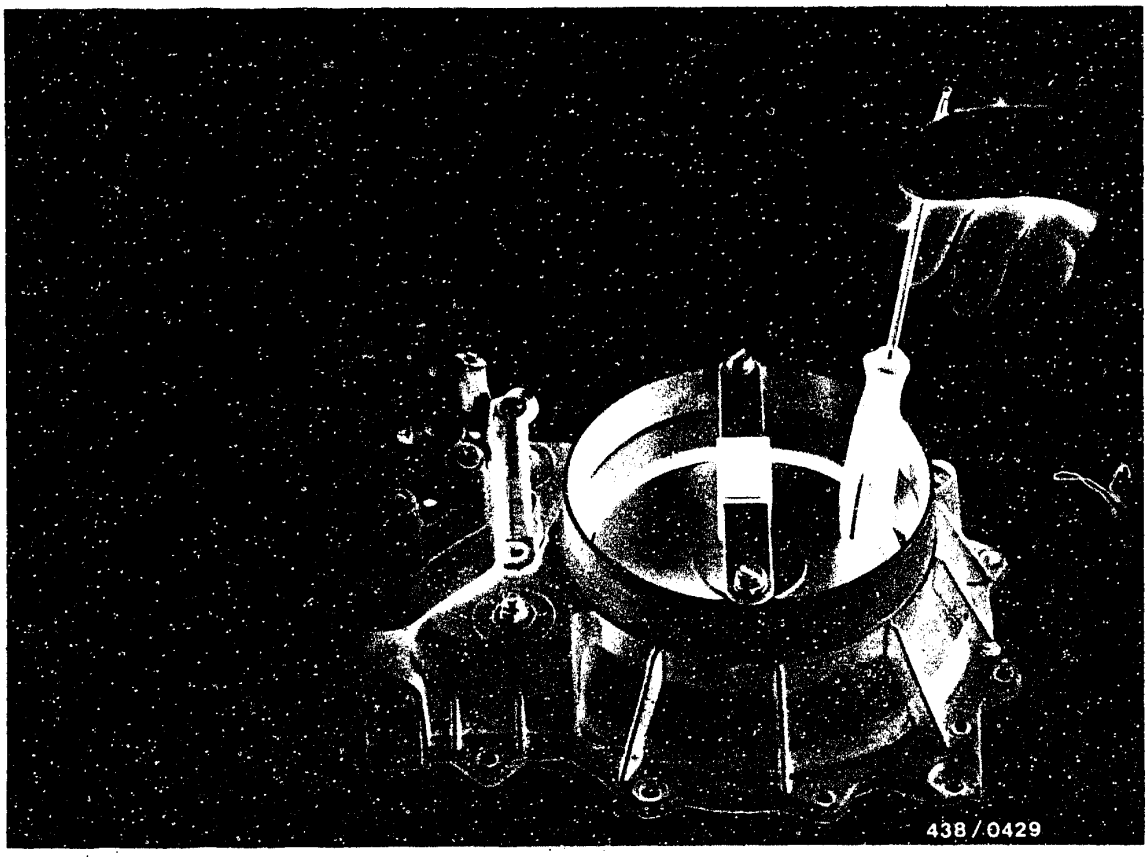
The arrows in the diagram show typical points where leaks can occur.
Check by performing a visual inspection or, in cases of doubt, as follows:

Disconnect the hose from the outlet of the auxiliary-air device and blow air through this hose into the intake system using a compressed-air gun. The throttle valve is to be fully open. Brush connection points with soapy water, or spray with leak detector (e.g. Güpoflex).

Under no circumstances may combustible liquids be used when testing for leaks.

The formation of bubbles or foam indicates a leak.
If a leak has been eliminated, it is necessary finally to adjust the idle speed with the engine at normal operating temperature:

Idle-speed adjustment is described on Coordinate F13.



9. Check the control lever in the air-flow sensor and the control plunger in the fuel distributor for ease of movement.

9.1 Preparations

- Engine temperature not below +20°C.
- Remove the air filter so that the air-flow sensor plate becomes accessible.
- Switch on the electric fuel pump for approx. 10 seconds by bridging the safety circuit.
  This results in application of the control pressure to the control plunger in the fuel distributor.

9.2 Check that the control lever moves freely

Depress the air-flow sensor plate by hand (downdraft) and release again.

The sensor plate snaps back into the zero position and bounces up about twice from the spring-loaded stop.

If the control lever does not move freely, first release all fastening screws holding the air-flow sensor to determine whether housing deformation is the cause of the problem.

If this is so, remove the seal between the mixture-control unit and the air-duct housing and replace with sealant Curil K 2 or Hylomar (Bosch Part No. 5 927 350 002).

Installation:
Remove the mixture-control unit.
Remove seal between mixture-control unit and air-duct housing. Clean the joint surfaces on the mixture-control unit and air-duct housing. Coat the joint surface on the air-duct housing with Curil K 2 or Hylomar.
Position the mixture-control unit and tighten the screws uniformly crosswise to 9...10 Nm (0.9...1.0 kgfm).

Check the joint surface on the mixture-control unit as follows for leaks:
Remove the hose from the outlet of the auxiliary-air device and blow air into the intake system through this hose using a compressed-air gun. Open the throttle valve fully while doing this. Brush joints with soapy water or spray with leak-detector spray (e.g. Güpoflex).

Under no circumstances may combustible liquids be used for testing for leaks.

Bubbling or foaming indicates a leak. Let the engine run.
Check all fuel connections for leaks.

Finally, carry out the idle adjustment with the engine at normal operating temperature.

Idle adjustment is described on Coordinate F 13.

If the housing is not deformed, repair or replace the air-flow sensor.

9.3 Check that the control plunger moves freely

Depress the air-flow sensor plate by hand (downdraft). The same resistance must be felt over the entire movement.

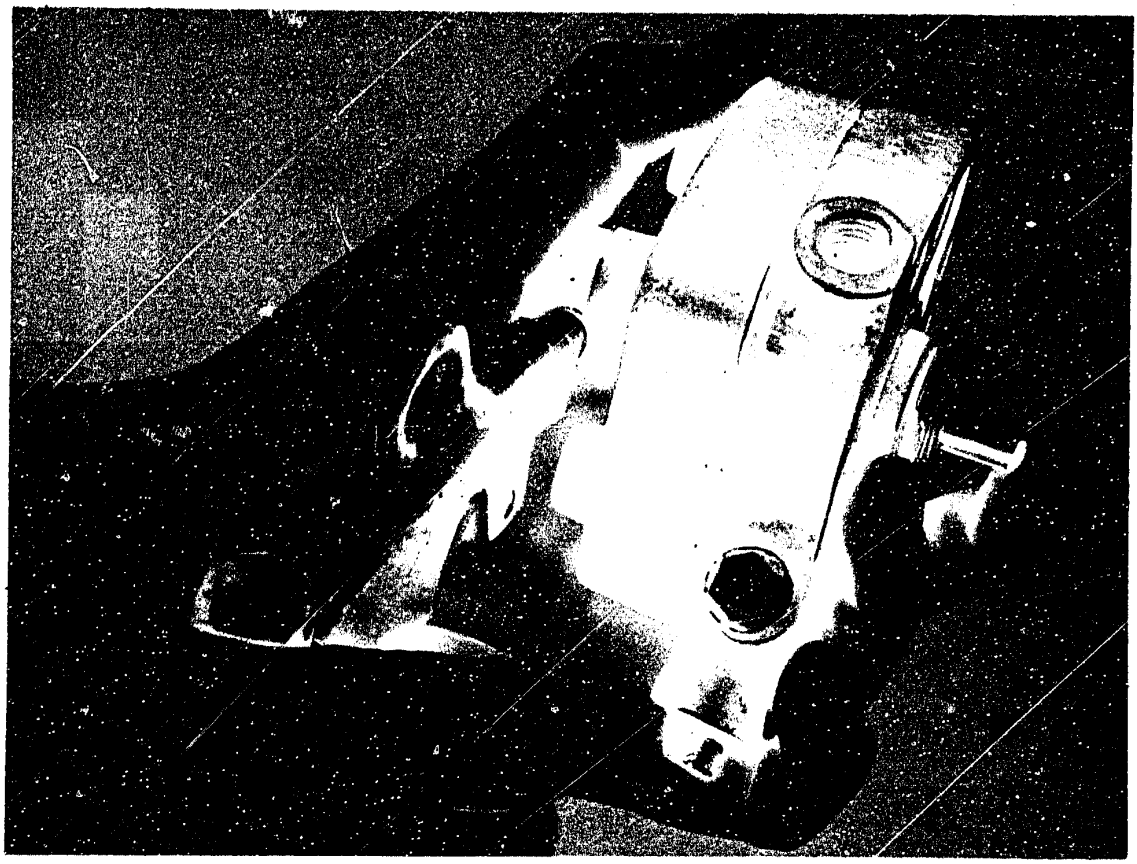
Move the sensor plate rapidly back to a position just in front of the zero stop. The control plunger follows this rapid movement of the sensor plate only sluggishly, and therefore initially loses contact with the sensor plate lever. It must be possible, however, to feel the plunger make contact with this lever again. If this condition is fulfilled, the control plunger can be considered to move freely.

If the control plunger does not move freely, remove the fuel distributor from the air-flow sensor.

Important!
Note the following when installing fuel components and fuel lines:

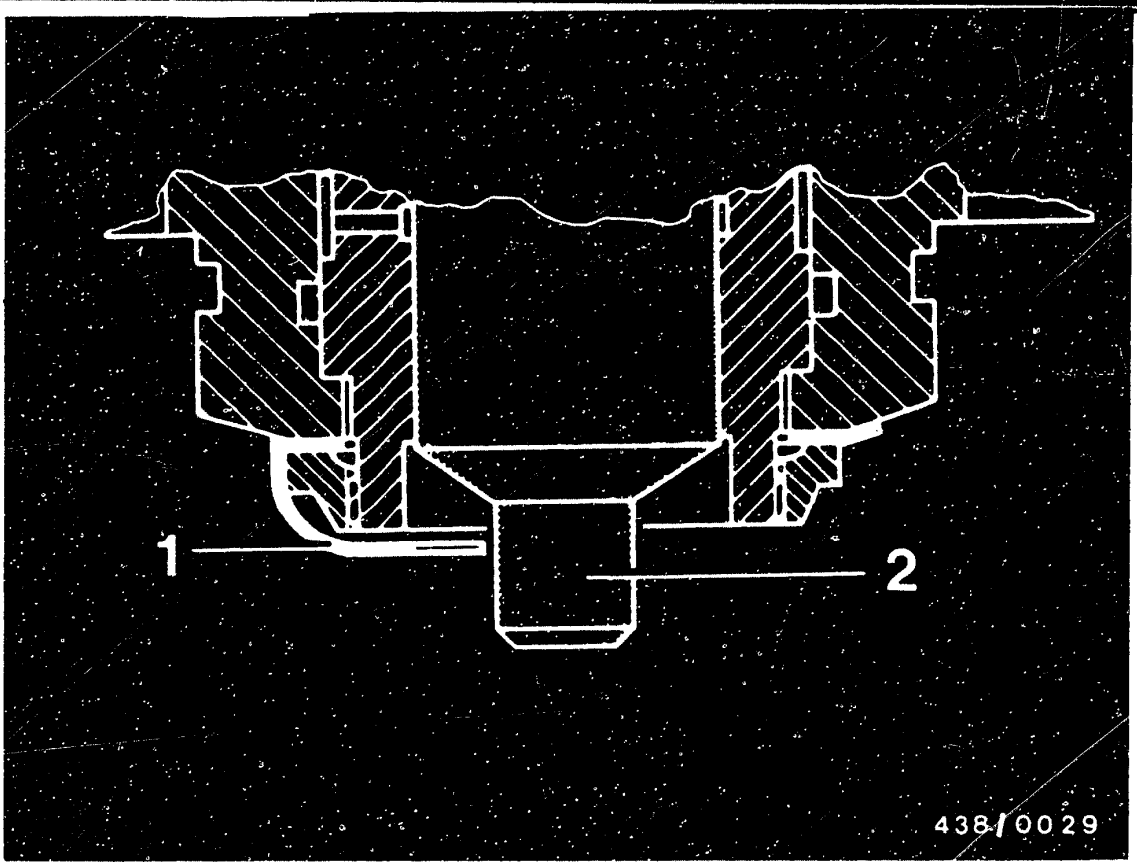
Always ensure utmost cleanliness when loosening or tightening the fuel connections. No dirt must enter the fuel system.

When loosening or tightening the fuel connections, apply counter-force at the fixed hexagon of the component. Clean the fuel distributor thoroughly in the region of the fuel connections. Screw off all connections. Screw out three fastening screws and remove the fuel distributor from the air-flow sensor.
The steel tubing must not be bent!



Remove the plunger. Under certain conditions, in order to do this it may be necessary to blow compressed air briefly against the plunger through the control-pressure connection hole. Hold the plunger with your hand while doing this. Clean the plunger thoroughly with benzine. If the plunger still does not move freely, replace the fuel distributor.

Caution:
Fuel distributors with an integral pressure-relief valve are additionally equipped with a helical compression spring above the control plunger.
Pay attention to the compression spring when removing the control plunger and remember to fit it again when re-assembling.

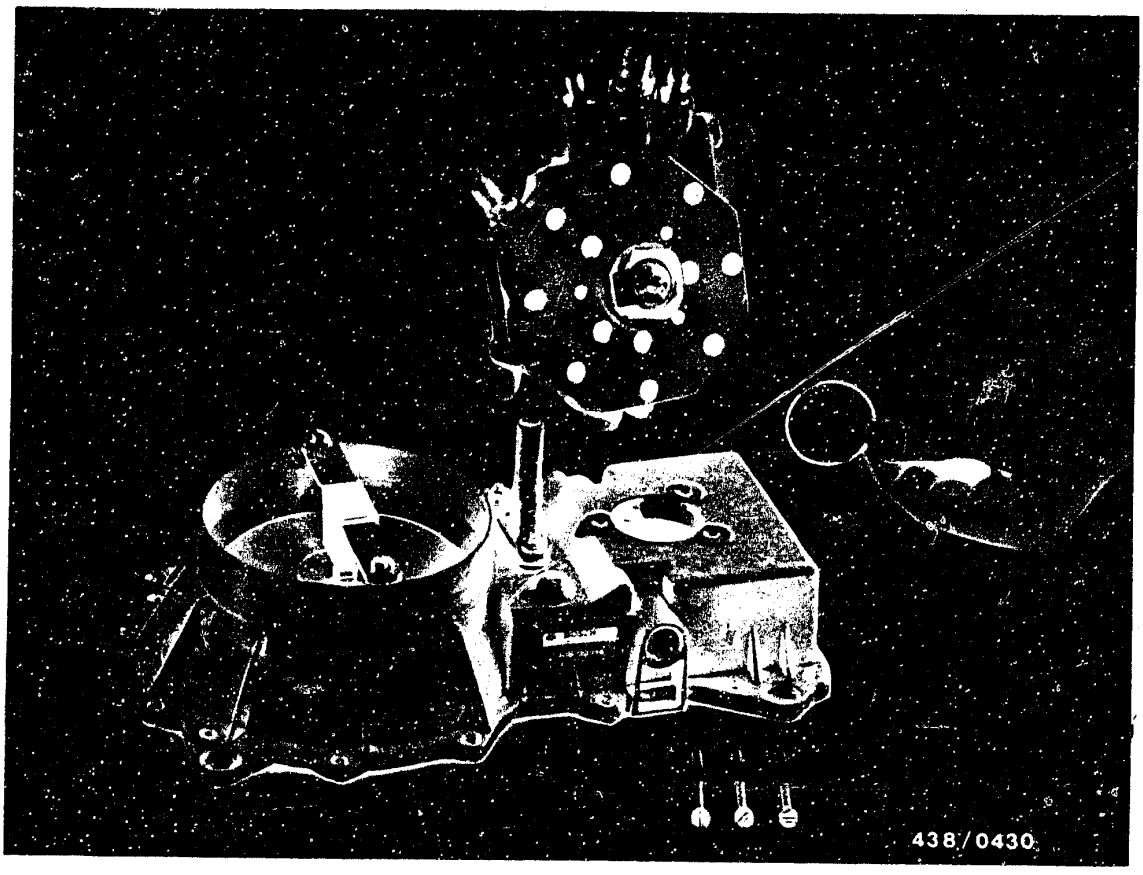


1 = Anti-drop-out device
2 = Control plunger

9.4 Fuel distributor with anti-drop-out device for the control plunger

Caution!
The fuel distributors have an anti-drop-out device for the control plunger.
This also protects the plunger in transit and facilitates installation.

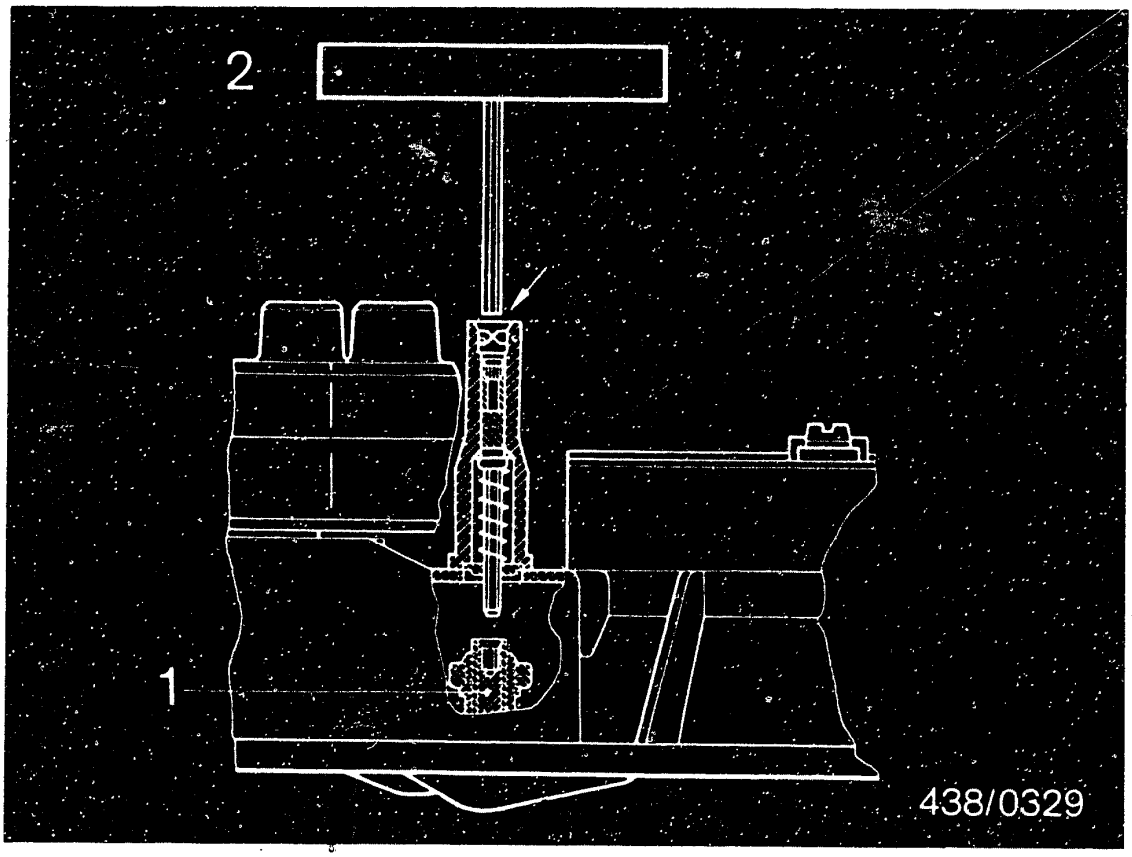
The anti-drop-out device must not be removed!



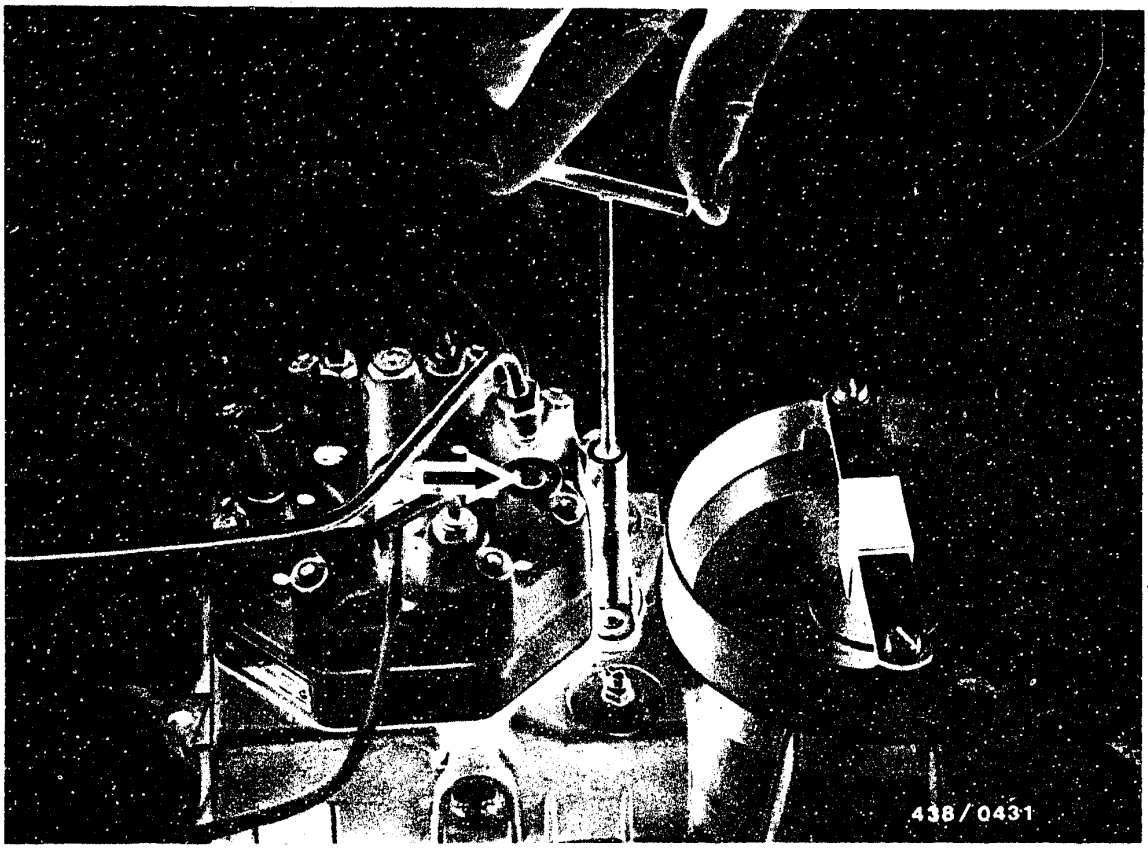
9.5 Fitting the fuel distributor

When fitting the fuel distributor, use a new seal ring between fuel distributor and air-flow sensor.
Observe the tightening torque 3.2...3.8 Nm (0.32... 0.38 kgfm) for the fastening screws precisely.
When connecting the fuel-injection tubing, use new seal rings.

Caution:
The connection screws of the fuel-injection lines on the fuel distributor should be tightened to a torque of 10...12 Nm (1...1.2 kgfm); if tightened too much, there is the danger that the lines may be crushed.



Matching the fuel distributor to the air-flow sensor for initial starting:
Screw off one fuel-injection line from the fuel distributor.
Bridge the electrical safety circuit so that the electric fuel pump operates.
The idle-mixture-adjusting screw is adjusted via a setting device rigidly fitted on the mixture-control unit with a spring-loaded hexagon-socket key.
To make the adjustment, carefully press down the hexagon-socket key of the setting device using the adjusting wrench KDEP 1035 (2) until it locks in position in the idle-mixture-adjusting screw (1).
Remove adjusting wrench after each adjustment.
The hexagon-socket-key is forced upwards by the built-in spring and automatically seals off the hole leading to the idle-mixture-adjusting screw by means of an O-ring seal.

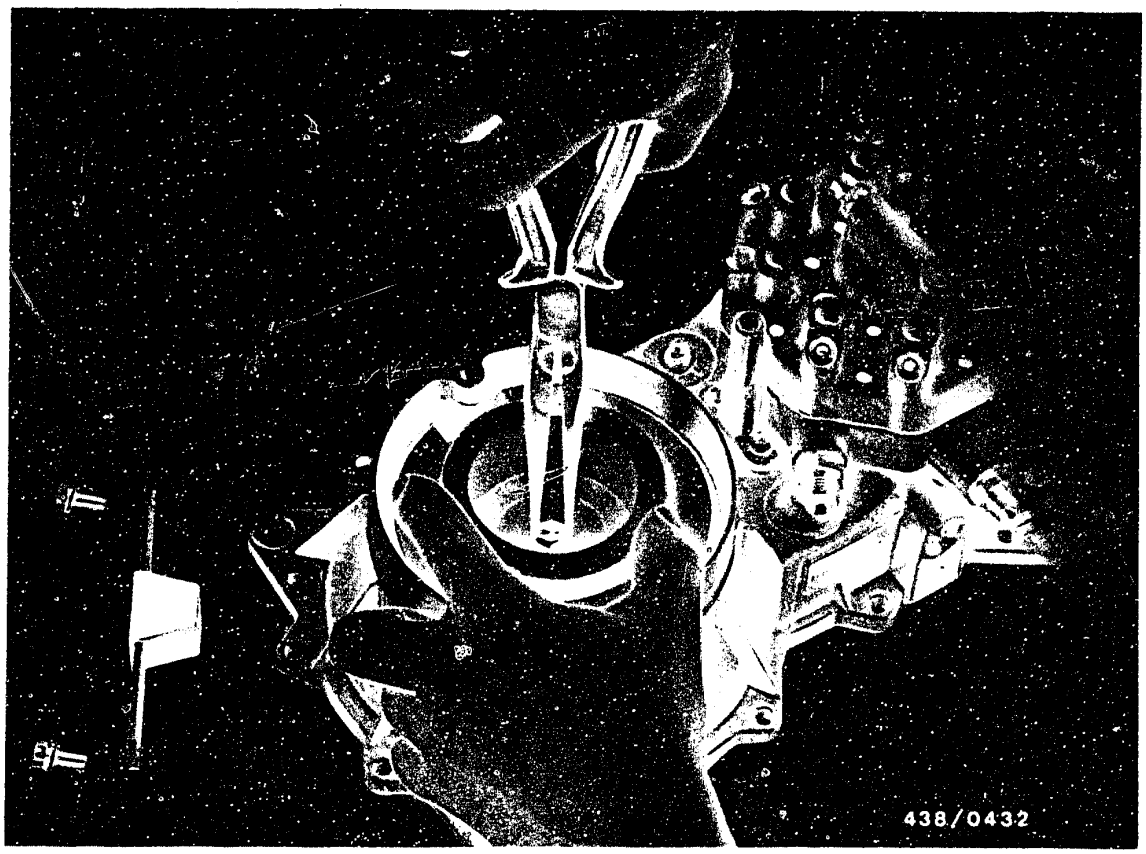


Screw in the idle-mixture-adjusting screw slowly and without exerting any great pressure on the adjusting wrench until fuel is just delivered from the open outlet (arrow) of the fuel distributor. Then turn back the adjusting screw by 1/2 turn.

Re-connect the fuel-injection line to the fuel distributor, start the engine and warm up.

The final matching of air-flow sensor and fuel distributor is carried out by adjusting the idle speed with the engine at normal operating temperature.

Idle-speed adjustment is described on Coordinate F13.



10. Checking and adjusting the position of the air-flow sensor plate

10.1 Preparations

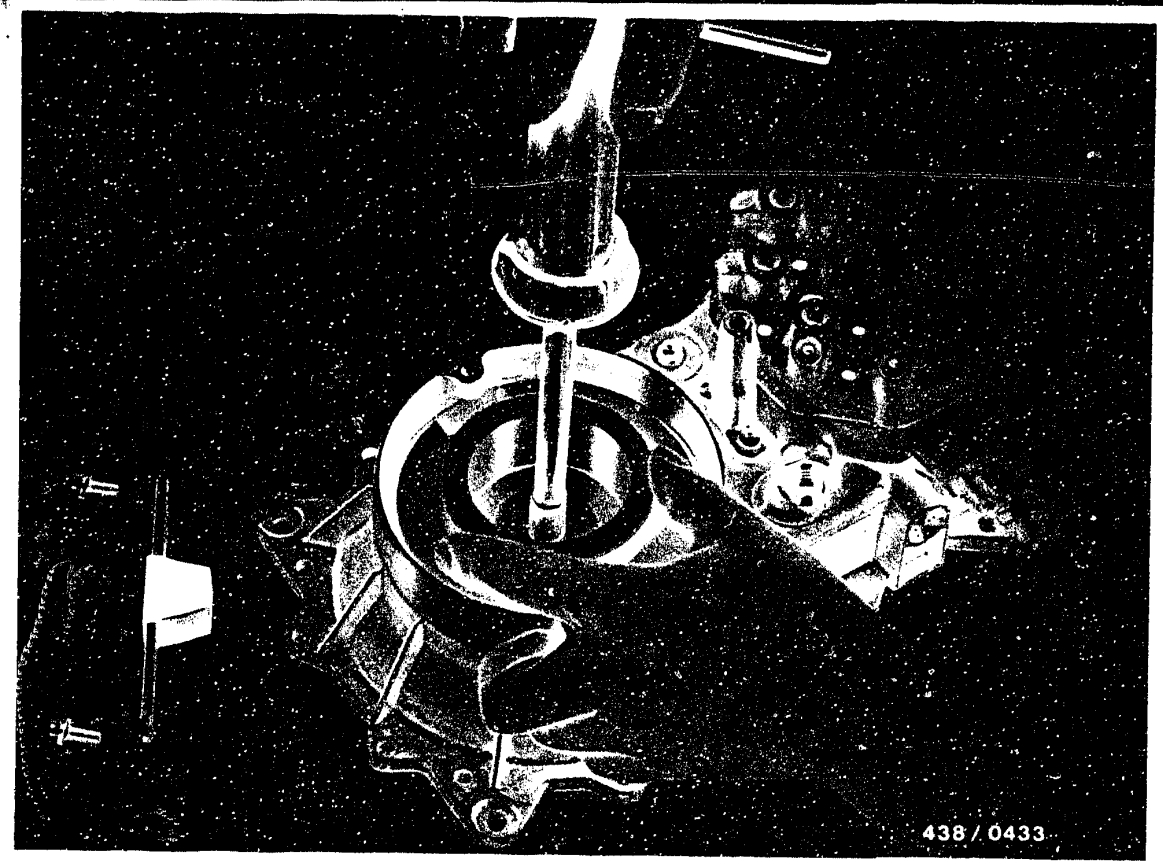
- Engine temperature is not important.
- Remove the air filter so that the air-flow sensor plate becomes accessible.

10.2 Centering the air-flow sensor plate

Check that the sensor plate is flat (not bent) and that it can move through the narrowest part of the air funnel without touching the funnel. If necessary, center it using a positioning ring KDEP 1040/10 (dia. 80 mm) as follows:

Remove the stop bracket after loosening the two fastening screws.

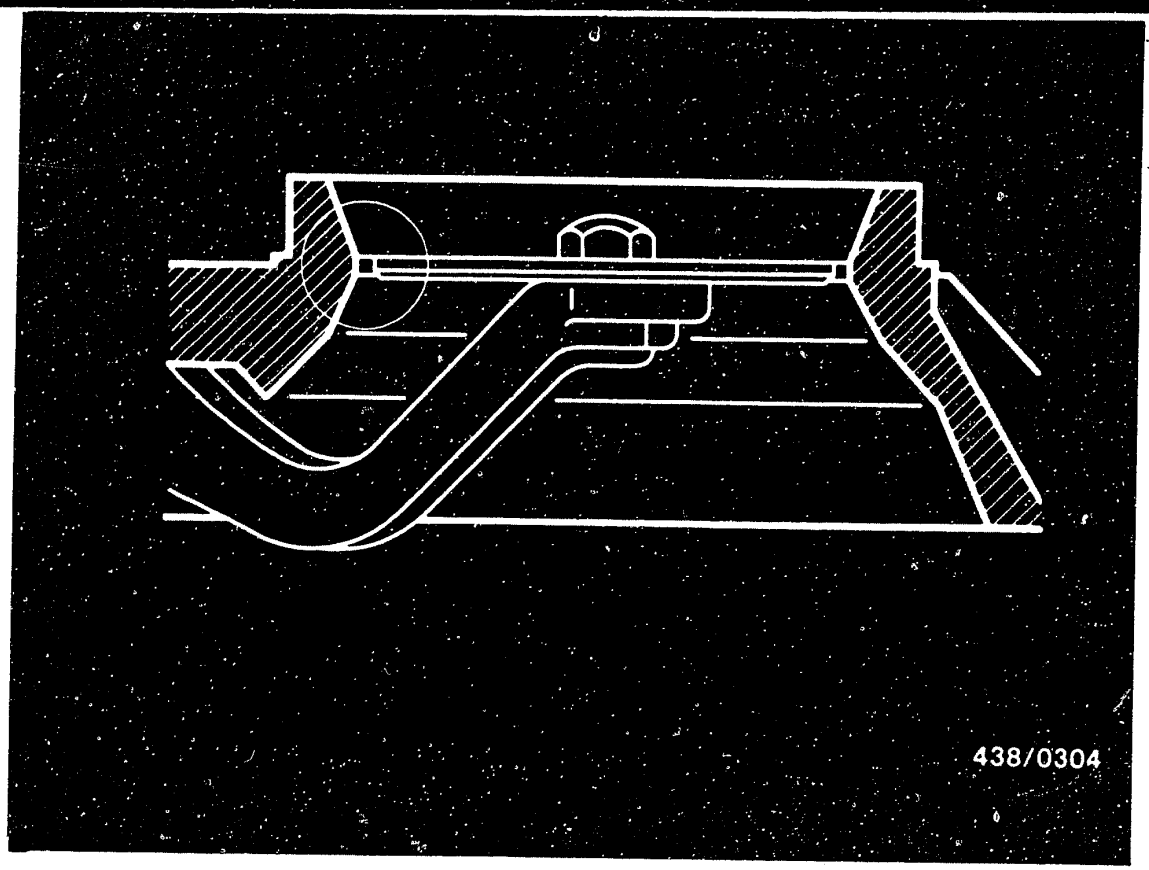
Loosen the sensor plate fastening screw. Insert the positioning ring while holding the fastening screws with pliers so that the sensor plate does not deflect downwards.



With the positioning ring in place, tighten the fastening screw with a torque of 5.0...5.5 Nm, loosen again and tighten again with the same torque.

When tightening the screw make sure that the air-flow sensor plate is in its zero position (in the cylindrical part of the air funnel).

It must no longer be possible to turn the air-flow sensor plate by hand.

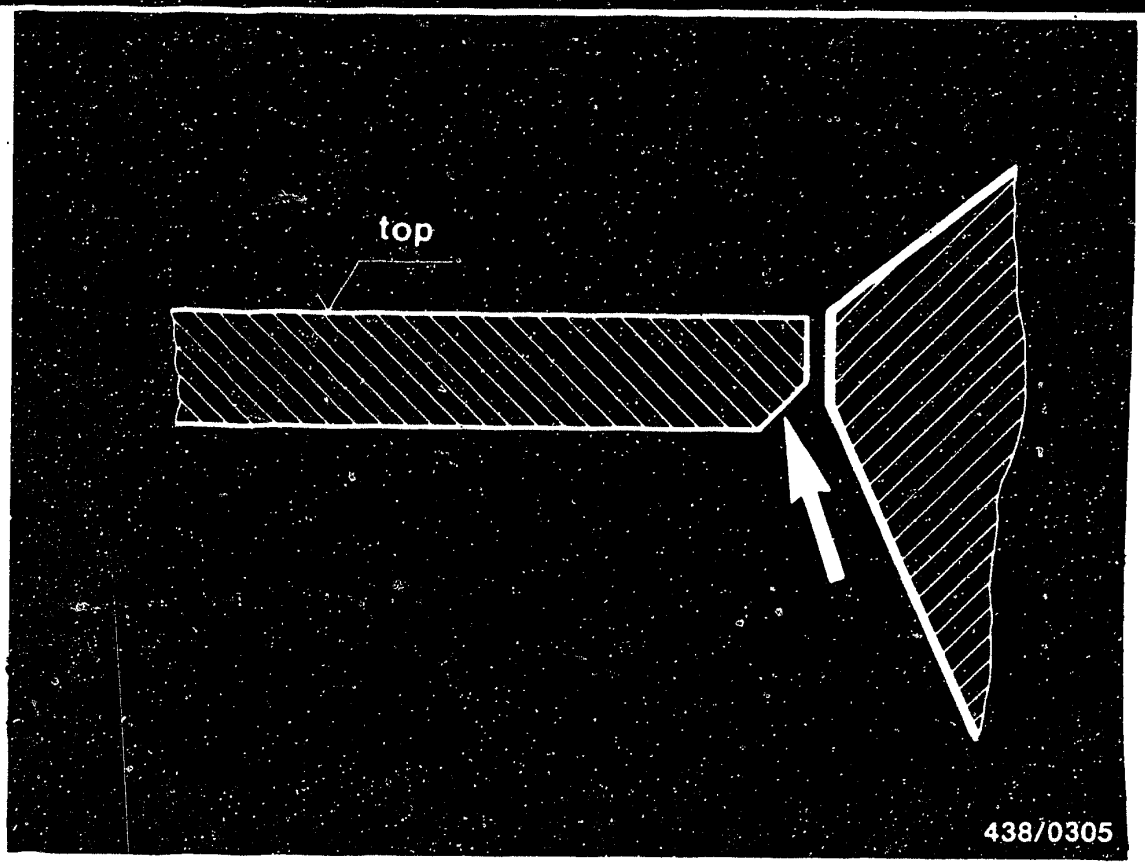


10.3 Checking and adjusting the zero position of the sensor plate
(Rest position):

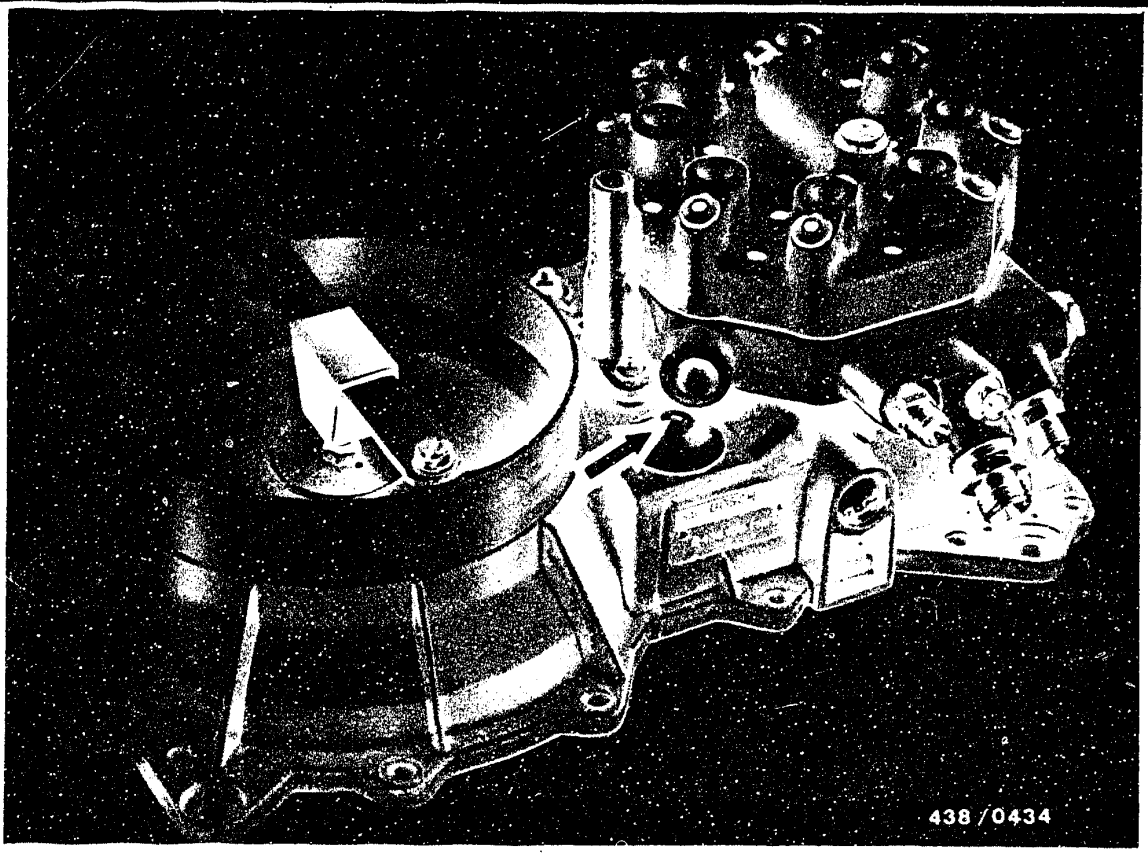
Switch on the electric fuel pump for approx. 10 seconds by bridging the safety circuit.
This results in application of the control pressure to the control plunger in the fuel distributor.

The upper edge of the sensor plate must be flush with the beginning of the cone (relief funnel, top) or max. 0.5 mm higher.

The air-flow sensor plate must be flat and must not project at any point on its circumference outside the cylindrical part of the air funnel.

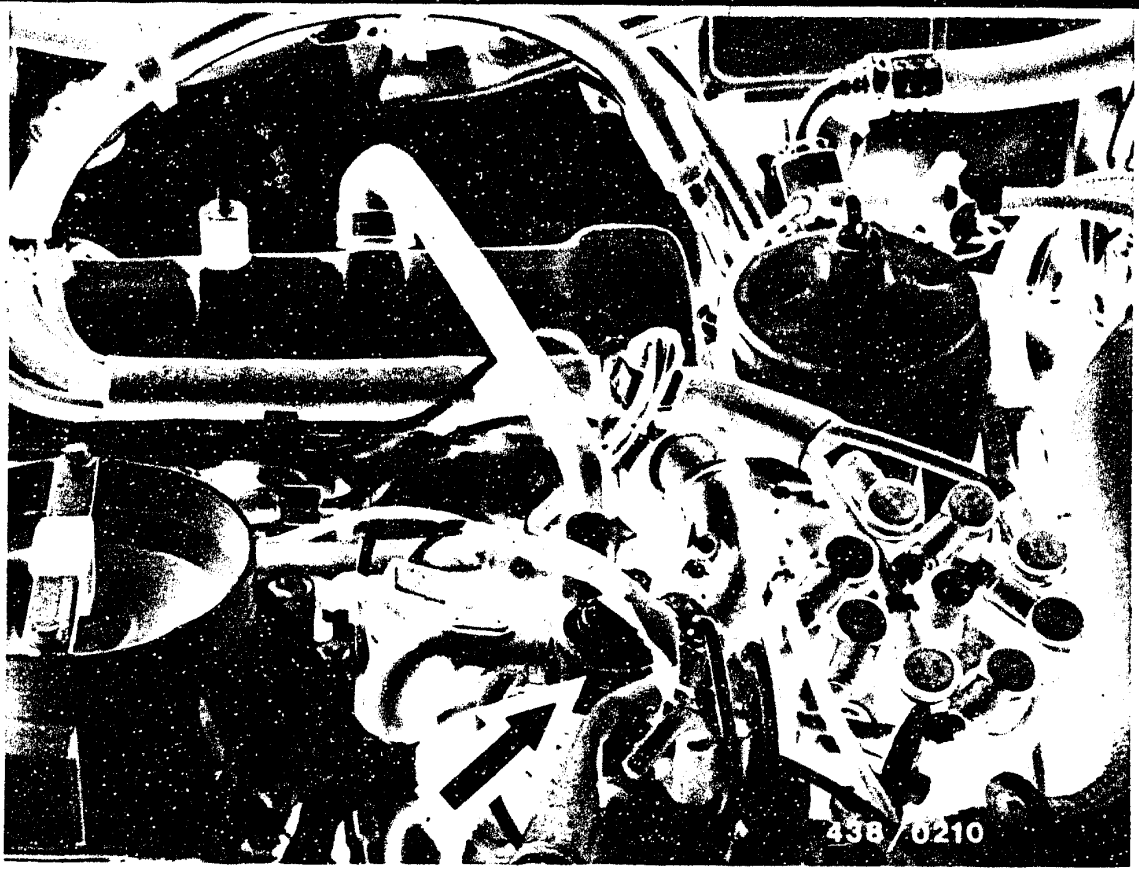


Caution:
The lower edge of the sensor plate is partially chamfered. Be absolutely sure that this chamfered edge is on the bottom (arrow). The upper side of the sensor plate is (in some cases) marked by the word "top".



If the sensor plate is positioned too high, an adjustment can be made. To do this, drive the guide pin (arrow) for the leaf-spring limit-stop deeper using a mandrel and a light hammer.

Caution:
Make this adjustment very carefully so that the guide pin is not driven in too far.
Be absolutely sure to avoid repeated adjustments in both directions because this can loosen the press fit of the pin. Serious engine damage can result if this pin should drop out.

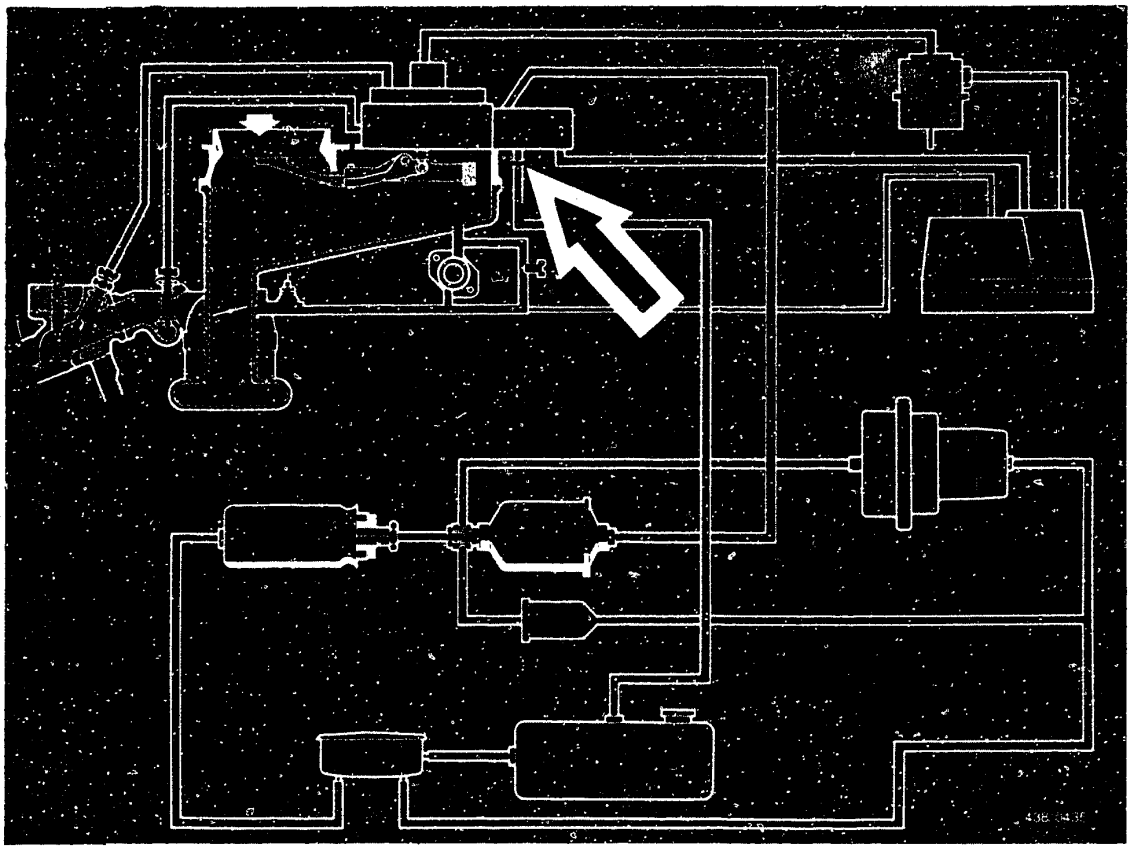


Auxiliary-air device = arrow

11. Checking the operation of the auxiliary-air device

By means of a visual inspection, possibly by blowing through, check whether the blocking plate is partially open with the engine cold. If necessary, use a flashlight and a mirror. If, with the engine cold, the blocking plate is not open, replace the auxiliary-air device. In order to check the closing of the blocking plate, warm the engine up to operating temperature. The blocking plate of the auxiliary-air device must be entirely closed. Replace the auxiliary-air device if defective.

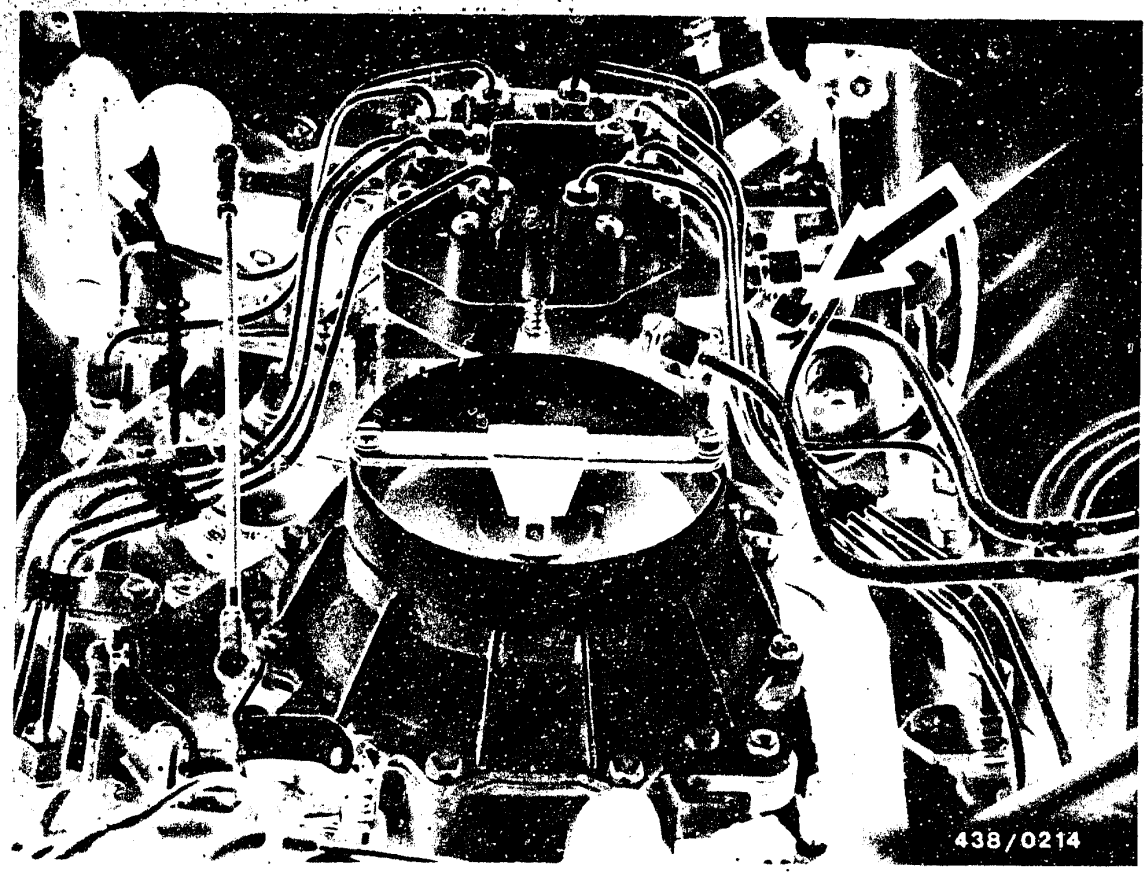
Electrical test is not necessary since the auxiliary-air device is heated by the coolant.



12. Checking the operation of the electric fuel pump.

12.1 Requirement

Conclusive information on the operation of the electric fuel pump can only be given by a measurement of fuel delivery under pressure, i.e. under primary (system) pressure. This measurement must therefore be made at the return line leading to the fuel tank (arrow).



12.2 Delivery of the electric fuel pump

Unscrew the fuel return line from the fuel distributor (arrow).
Equip a test hose (minimum inside diameter 8 mm) with a ball connector and union nut M14 x 1.5 and connect to the return port of the fuel distributor.
Hold the end of the hose in a graduate (approx. 1.5 litres capacity) in order to make the measurement.
Pull off the plug from the warm-up regulator.
Switch on the electric fuel pump for 30 seconds by bridging the safety circuit.
Collect the fuel delivered during the 30 seconds in a graduate.

12.3 Test specification

Fuel delivery:

3.5 l; 3.8 l engine	at least 1000 cm^3/30 s
4.5 l; 5.0 l engine	at least 1100 cm^3/30 s

12.4 Possible causes of insufficient fuel delivery

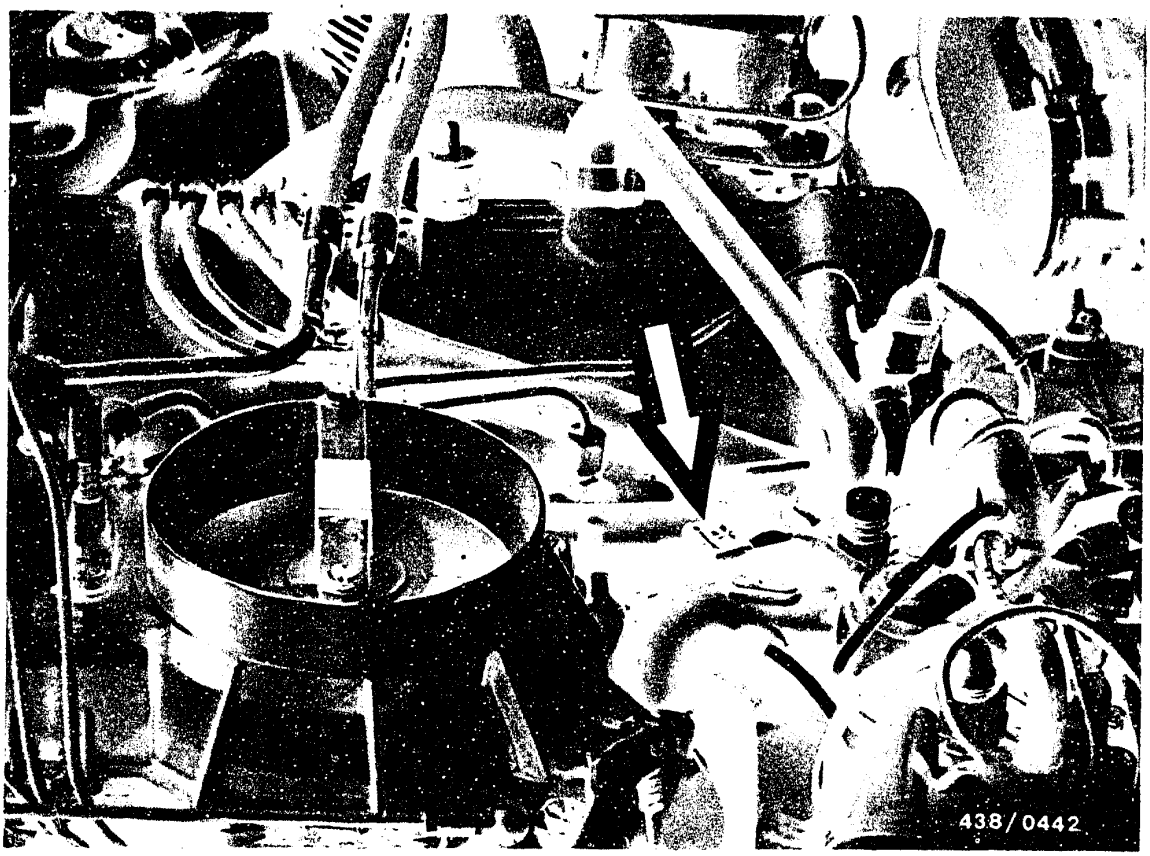
- Power supply to the electric fuel pump defective.

- Voltage drop at the connection of the electric fuel pump.
Minimum voltage with pump operating is 11.5 V.

- Fuel filter very dirty.

- Primary pressure too high.

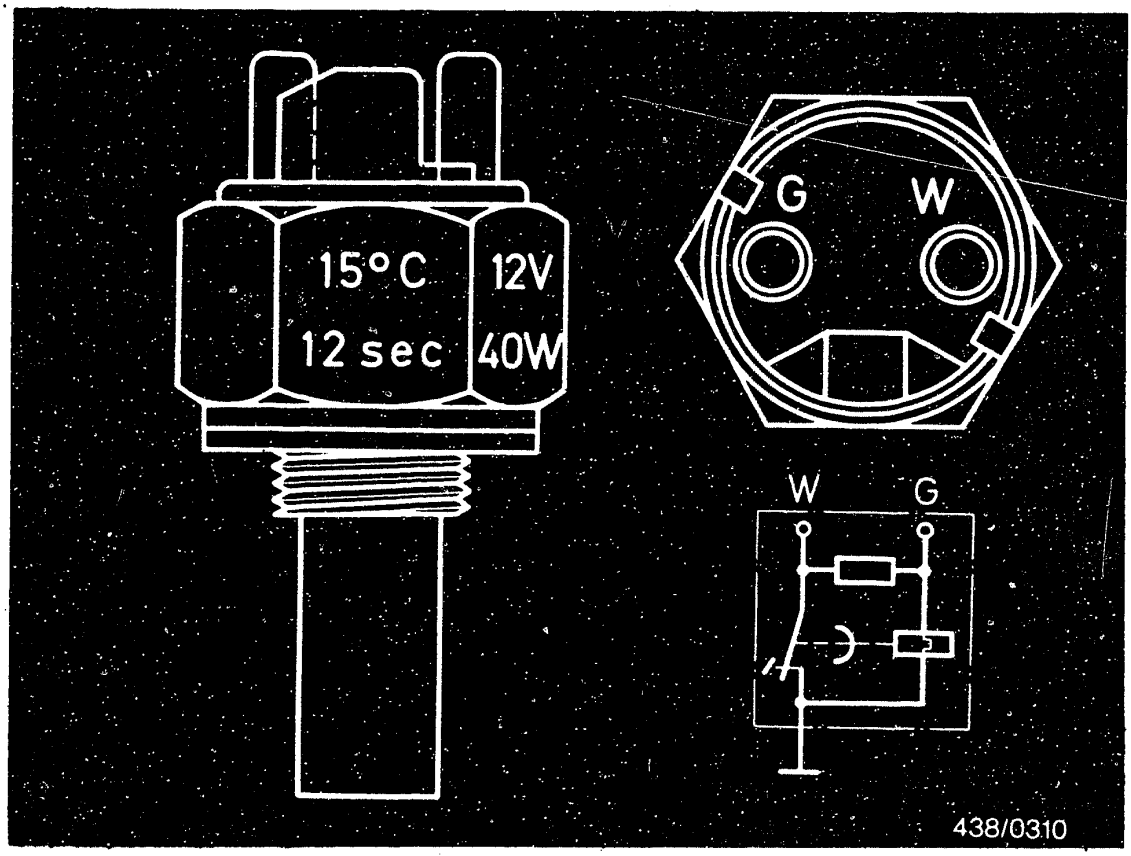
If these items are in proper condition, replace the electric fuel pump. To do this, pinch off the fuel intake hose from the fuel tank to the intake-noise damper (e.g. using hose clamper W 157 from Matra Co.). When installing, pay attention to the correct position of the electric fuel pump. Danger of bending the fuel lines.



13. Checking the cold-start system (thermo-time switch, cold-start valve).

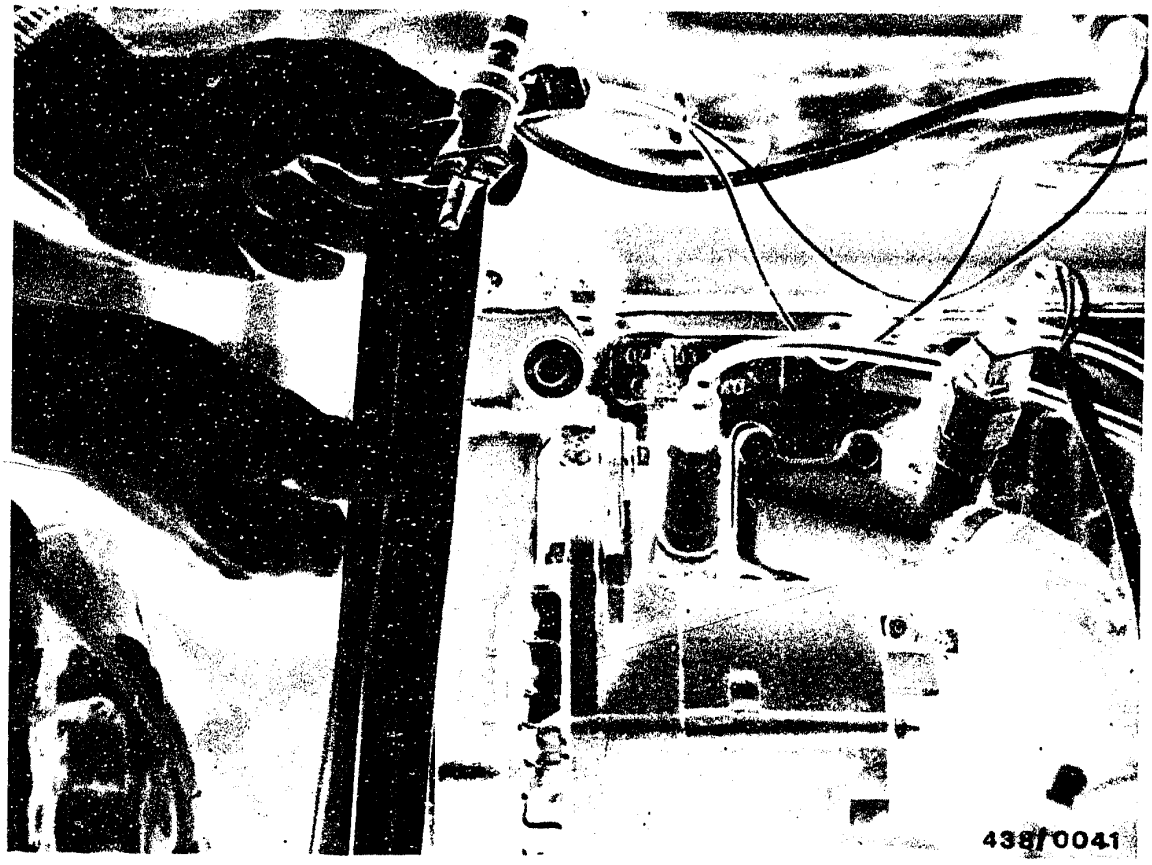
13.1 Thermo-time switch (not a Bosch product)

Pull off the plug.
Remove the thermo-time switch for testing.
Collect any escaping coolant in a container.



The switching temperature +15°C and the switching time at -20°C of 12 seconds are stamped into the hexagonal section of the thermo-time switch.
The removed thermo-time switch is tested using the ohm-meter in accordance with the specifications given below. The temperatures for the thermo-time switch can easily be obtained with water. Cooling takes place in a freezer chest.

At a temperature below °C	above °C	Resistance measurement (Ω) between Term. "G" and "ground" (housing)	Term. "W" and "ground" (housing)	Term. "G" and term. "W"
+10		40...60	0	40.. 60
	+20	50...70	240...300	180..240



13.2 Start valve

Remove the start valve. Connect a hose line instead of the steel tubing.
Pull off the plug and connect the start valve directly to ground and to terminal 15 (e.g. at the ignition coil) using connecting cable KDJE 7450/70.
Important note:
During this test, do not let the connecting cable touch B+. Danger of fire due to sparking!
Hold the start valve in a suitable container (e.g. the graduate).
Switch on the electric fuel pump by bridging the safety circuit.
Switch on the ignition (max. 30 seconds). The start valve must now open and spray fuel.

Switch off the ignition, remove the electric connecting cable and dry the nozzle of the start valve.
The safety circuit remains bridged so that the primary pressure is applied to the start valve.
No droplets of fuel must drip from the nozzle of the start valve during the next minute. Even if shaken and knocked, the start valve must not leak.
Then switch the electric fuel pump off again.
Replace the start valve if it does not open or if it leaks.

If a leaky start valve or a defective thermo-time switch has been replaced, it is necessary finally to adjust the idle speed with the engine at normal operating temperature.
Idle-speed adjustment is described on Coordinate F13.

14. Checking the control pressures

14.1 Preliminary remarks:

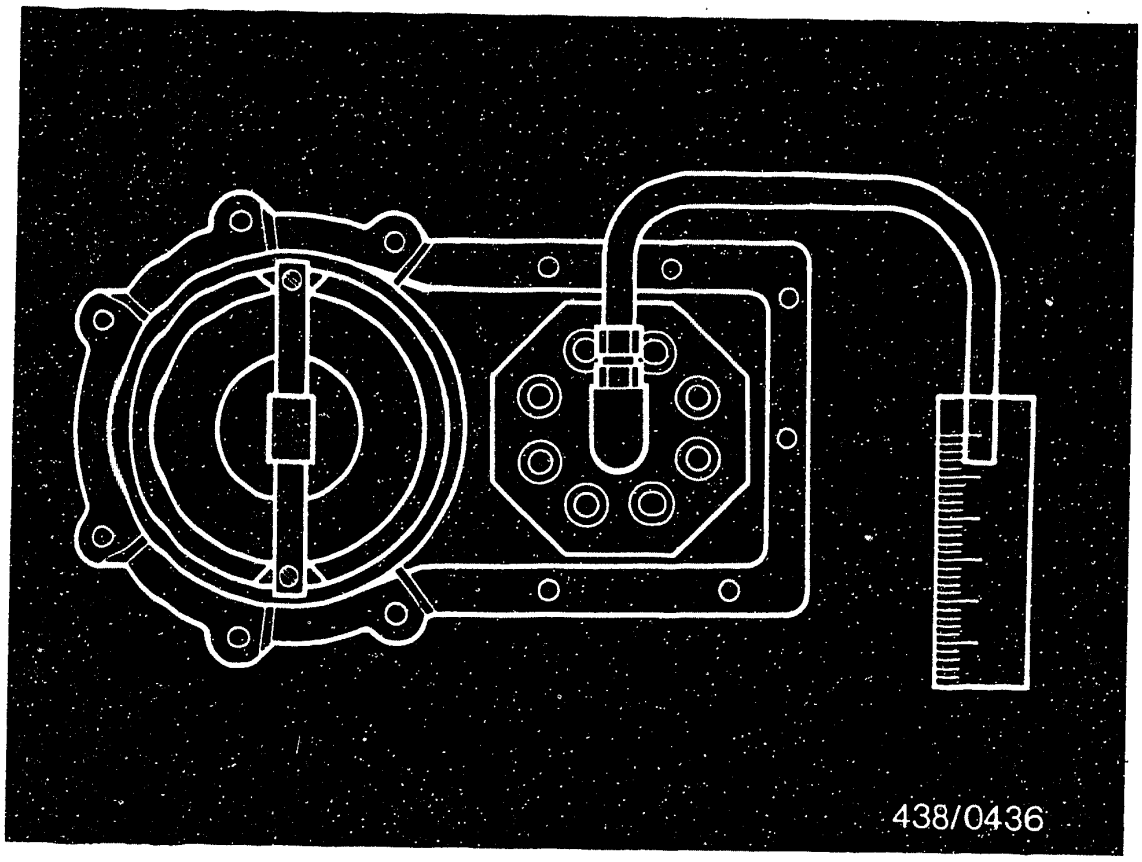
The control pressures tested in the following are in each case governed by the warm-up regulator.

If the test results are incorrect, however, this may also be due to faults which have nothing to do with the warm-up regulator.

These possible faults are:

- No or too low a voltage at the electric connector.
- Fuel return from the warm-up regulator blocked or constricted.
- Too high a fuel delivery for the control-pressure circuit.

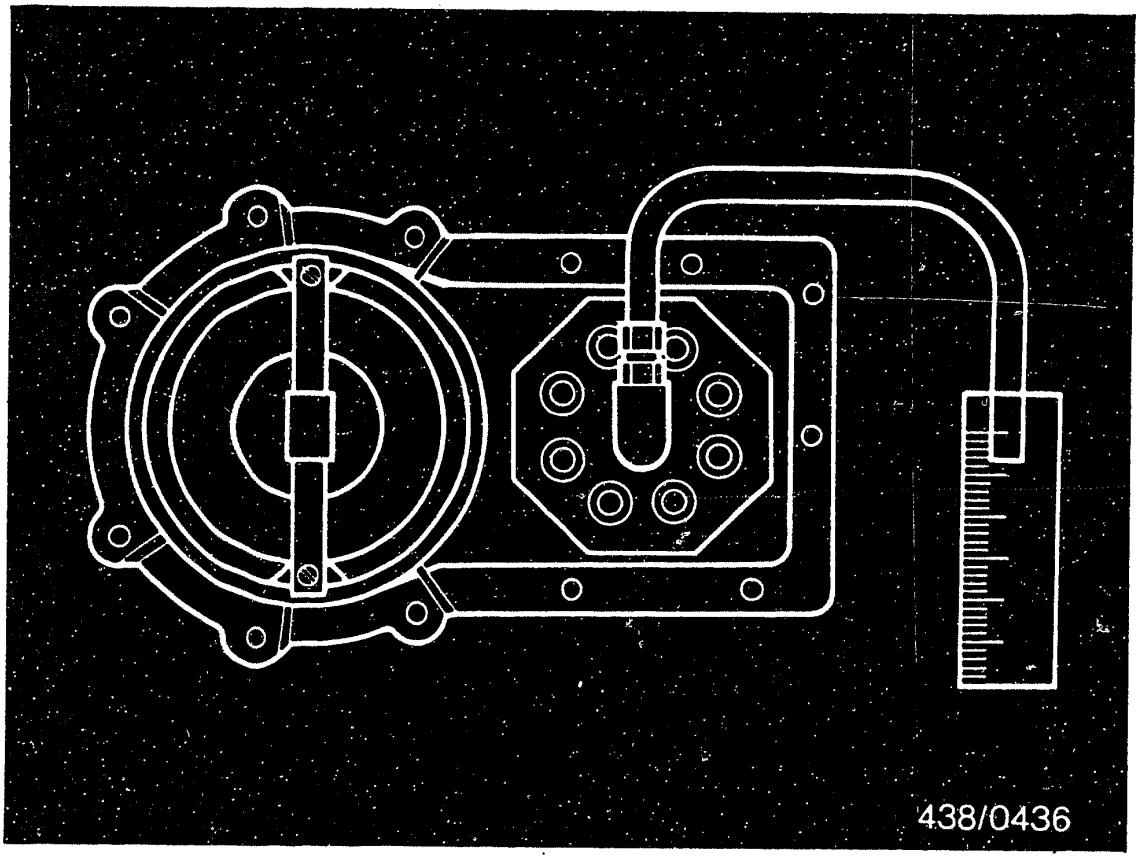
The testing of this control pressure delivery is described as an additional test step at the beginning of the control pressure tests. Test specification: 160...240 cm^3/min.
Reference is made to the other possible causes of trouble in the respective test step.



14.2 Checking the fuel delivery for the control-pressure circuit:

Before testing, make sure that the electric fuel pump is operating properly (Coordinate B22).
Unscrew the control-pressure line (to the warm-up regulator) from the fuel distributor.

Connect the connecting hose KDJE-P100/11/1 (formerly KDEP 1034/11/1) of the pressure tester to the control-pressure port of the fuel distributor and hold hose in graduate (approx. 0.5 litre capacity).

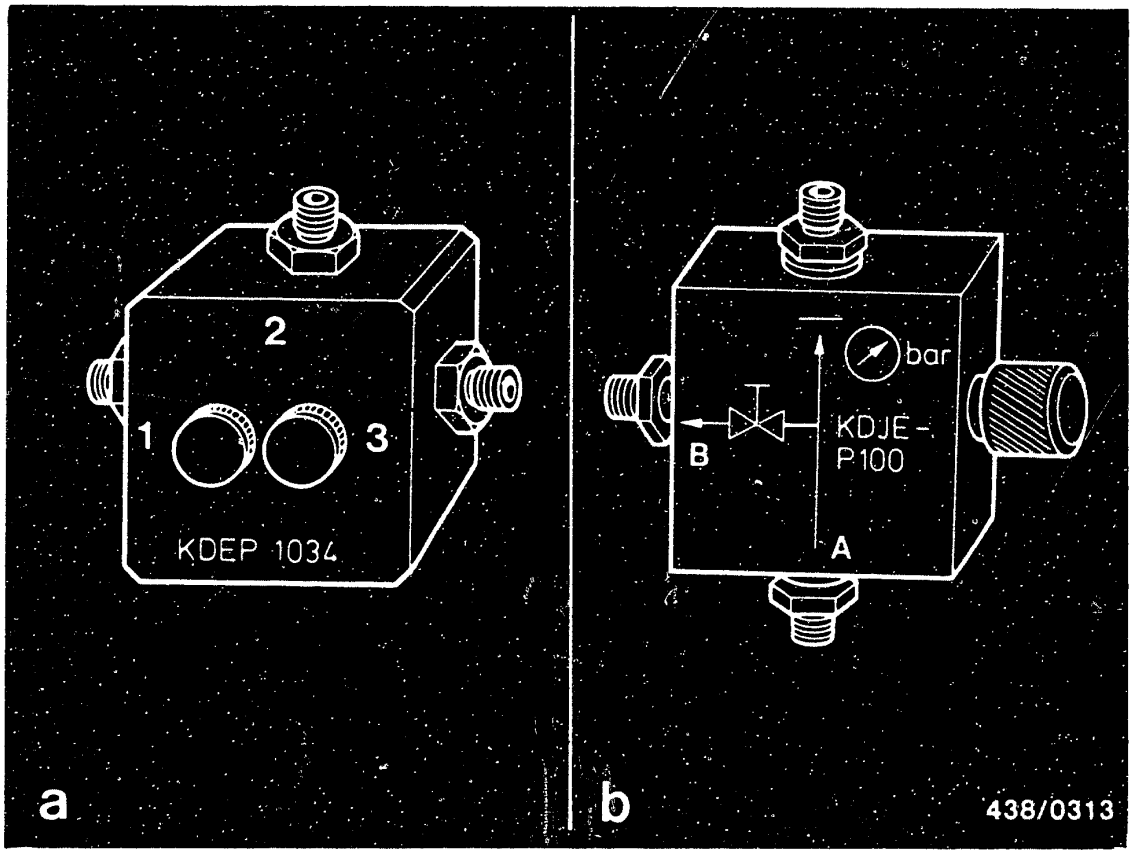


Switch on the electric fuel pump for 1 minute by bridging the safety circuit.
Measure delivery.

Test specification: 160...240 cm^3/min.

If the measured value is outside tolerance, the fault is in the fuel distributor.

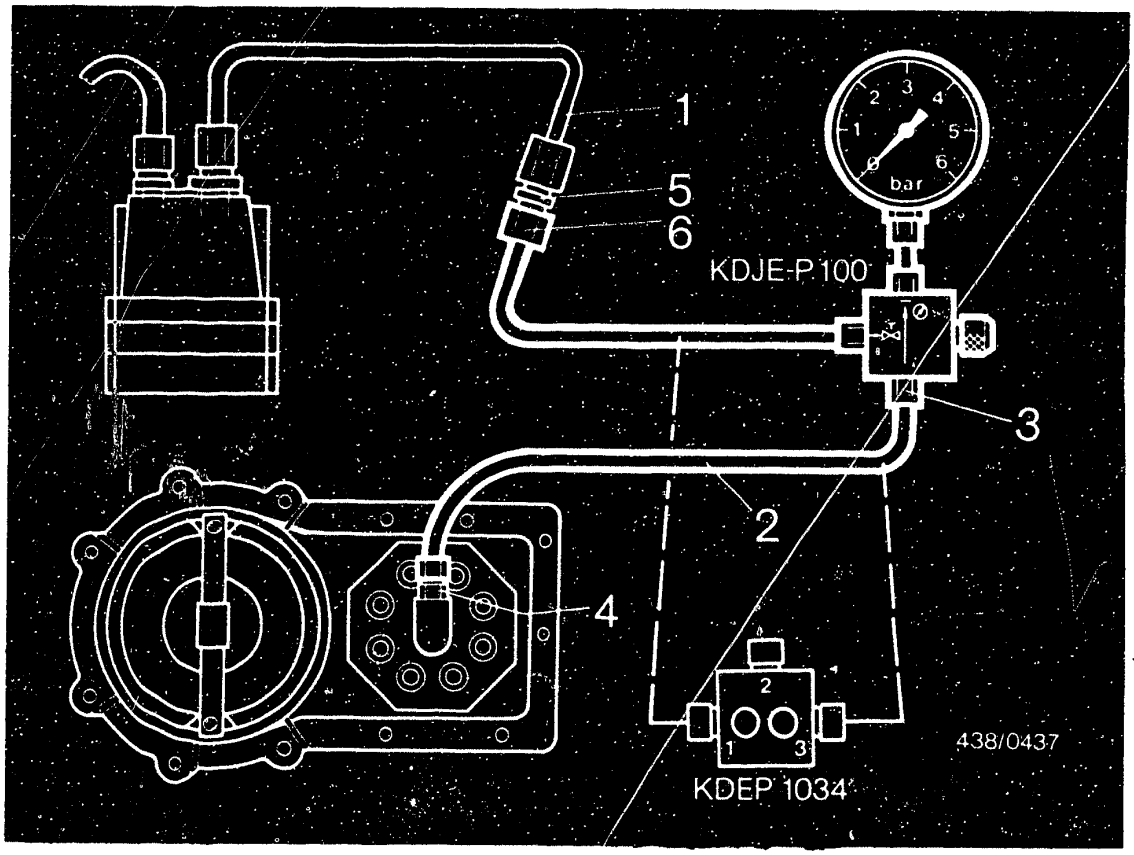
Replace the fuel distributor.



14.3 Mounting the pressure tester KDJE-P100 (formerly KDEP 1034):

The pressure tester KDEP 1034 is equipped with a three-way valve with 2 separate valve screws. The connections of the directional-control valve are numbered (Fig. a). Since the end of 1979 the pressure tester KDJE-P100 has been supplied. Its directional-control valve has only one valve screw (Fig. b). The connections of this directional control valve are identified by symbols:
A = Inlet (from the fuel distributor)
B = Outlet (to the warm-up regulator)

Caution:
When the directional-control valve is not in use, always keep the valve screw(s) open in order to relieve the pressure on the seal rings.



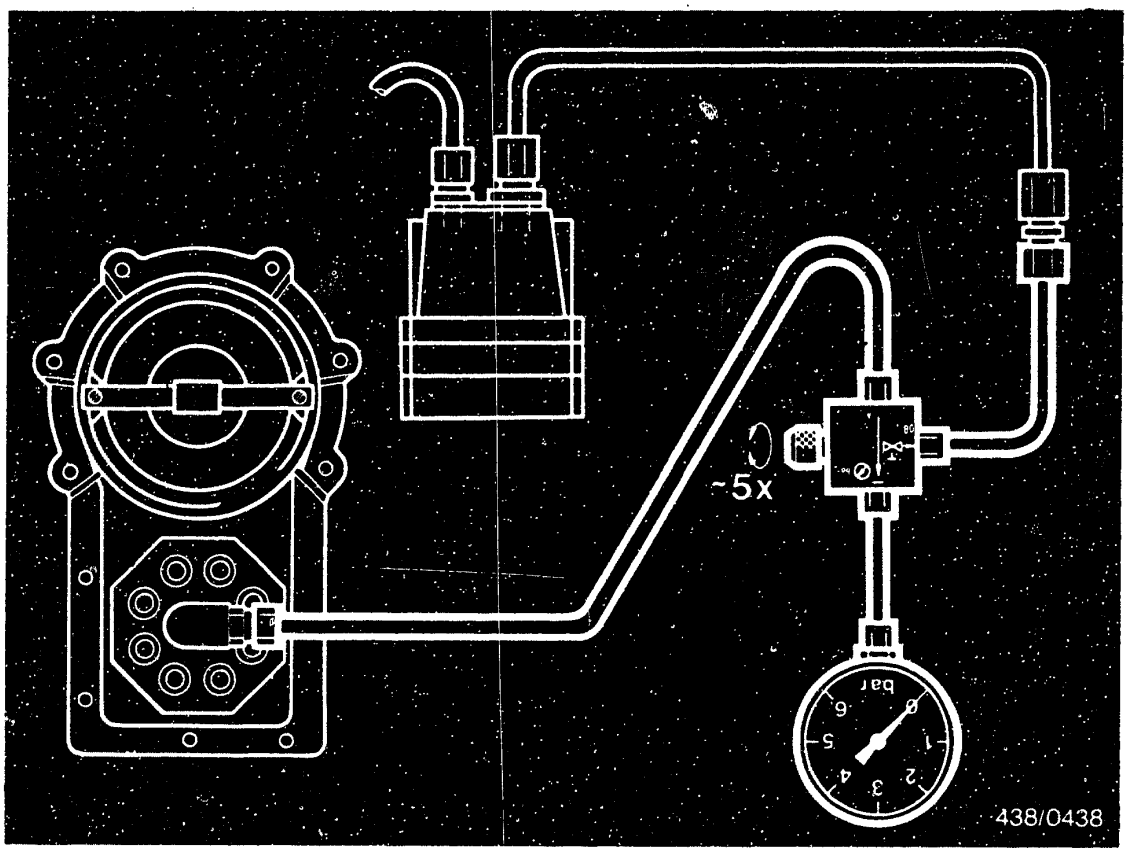
The directional-control valve is connected into the control-pressure line from the fuel distributor to the warm-up regulator:

The connecting-parts set KDJE-P100/11 (formerly KDEP 1034/11) is additionally required.

Unscrew the control-pressure line (1) from the fuel distributor. Connect the connecting hose KDJE-P100/11/1 (2) to the inlet fitting (3) of the directional-control valve and connect to control-pressure connection port (4) of the fuel distributor.

Screw double fitting (5) of the connecting-parts set into hose end (6) of directional-control valve and connect to control-pressure line (1).
Steel tubing of control-pressure line must not be bent!

Hang the pressure gauge from the hood (possibly using wire hook).



14.4 Bleeding the pressure tester

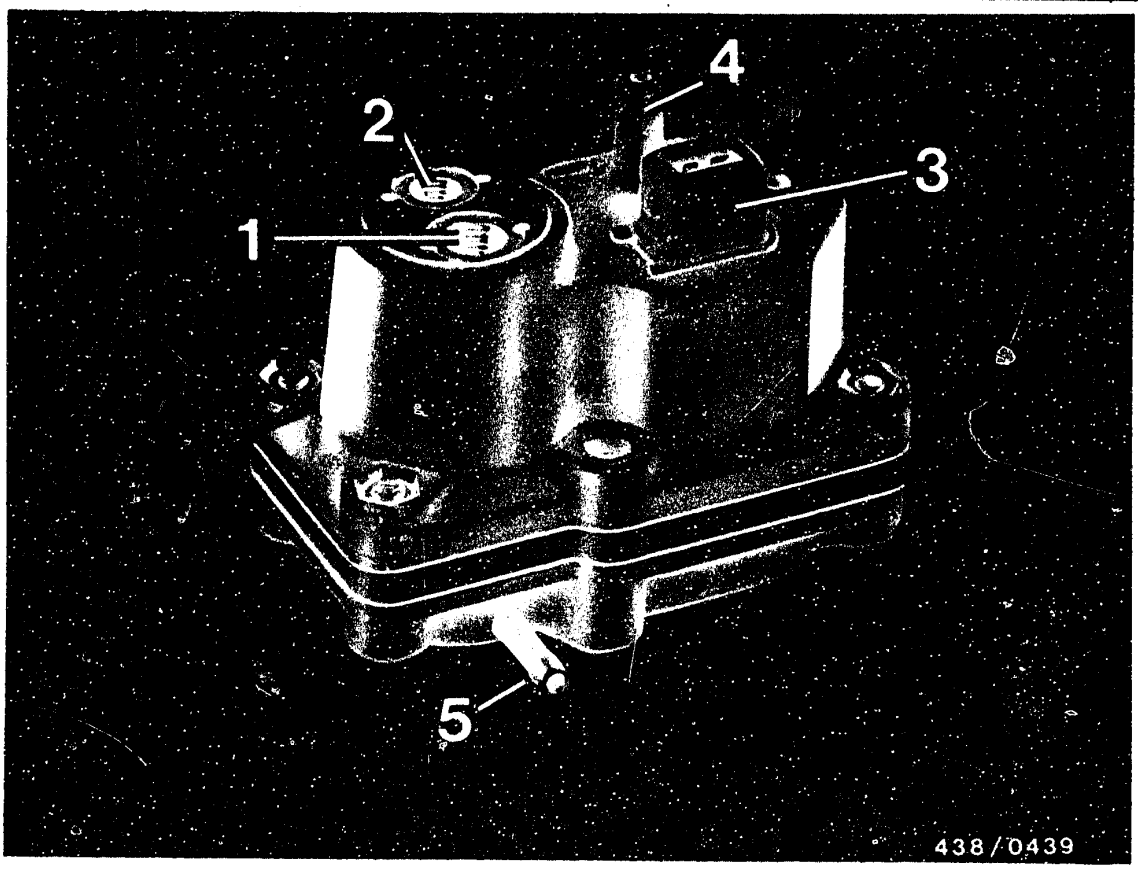
Disconnect the electric plug from the warm-up regulator. Let the pressure gauge hang down (hose fully extended).

Switch on the electric fuel pump by bridging the electrical safety circuit.

Open and close the valve screw(s) of the directional-control valve in a 10-second rhythm about 5 times.

Then hang the pressure gauge from a suitable support (e.g. from one of the struts under the engine hood).

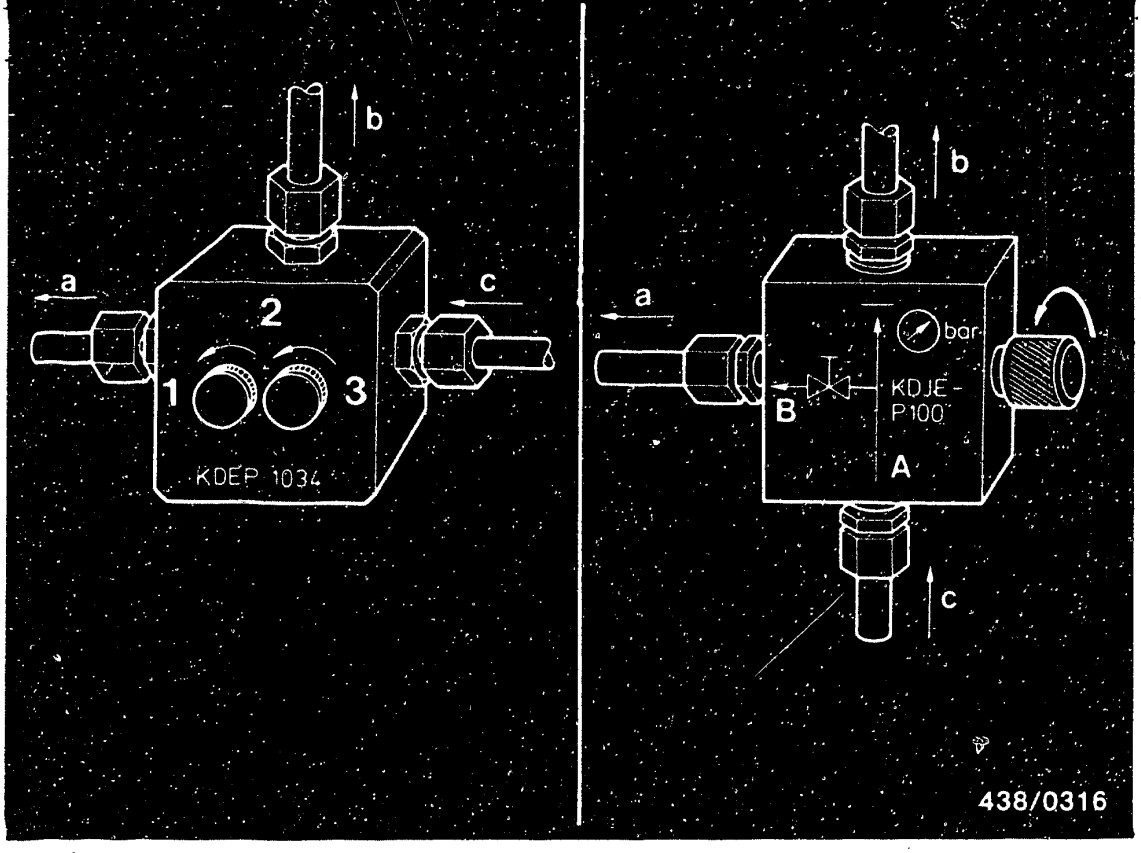
Open valve screw of directional-control valve (both screws in the case of KDEP 1034) (turning to the left).



1 = Inlet port (M 10 x 1)
2 = Return port (M 8 x 1)
3 = Electric terminal
4 = Intake-manifold-pressure connection port
5 = Atmospheric-pressure-connection port

14.5 Checking the control pressure - warm-up regulator 0 438 140 056
(version for intake-manifold-controlled full-load enrichment).

The cold and warm control pressures are additionally influenced by the intake-manifold pressure acting on the full-load diaphragm of the warm-up regulator.
The intake-manifold-pressure connection port is located on the top of the housing cover. The base plate contains a connection port for atmospheric pressure (connected to the engine before the throttle valve).



a = To warm-up regulator
b = To pressure gauge
c = From fuel distributor

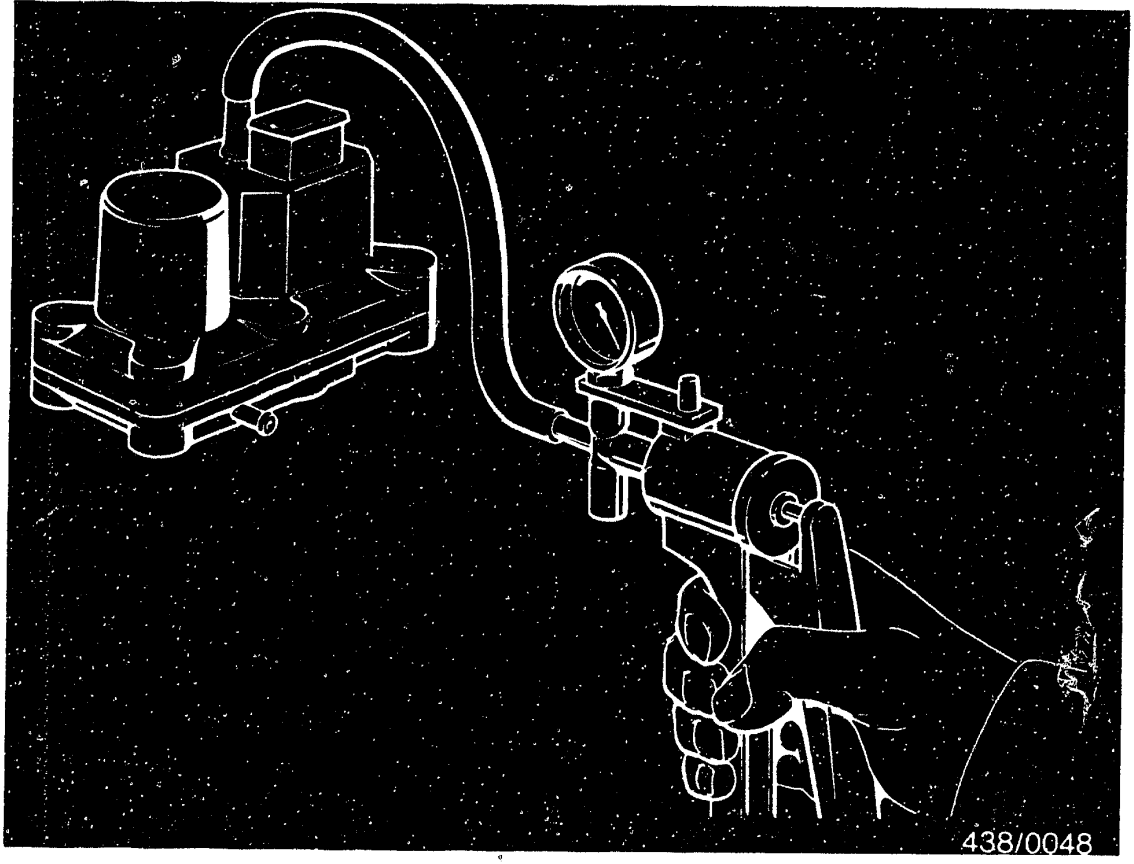
14.6 Testing the "cold" control pressure

The test is performed with the engine switched off. The engine must be cold. For this purpose, the engine should have been switched off for several hours, preferably overnight.

Pull off the plug from the warm-up regulator.

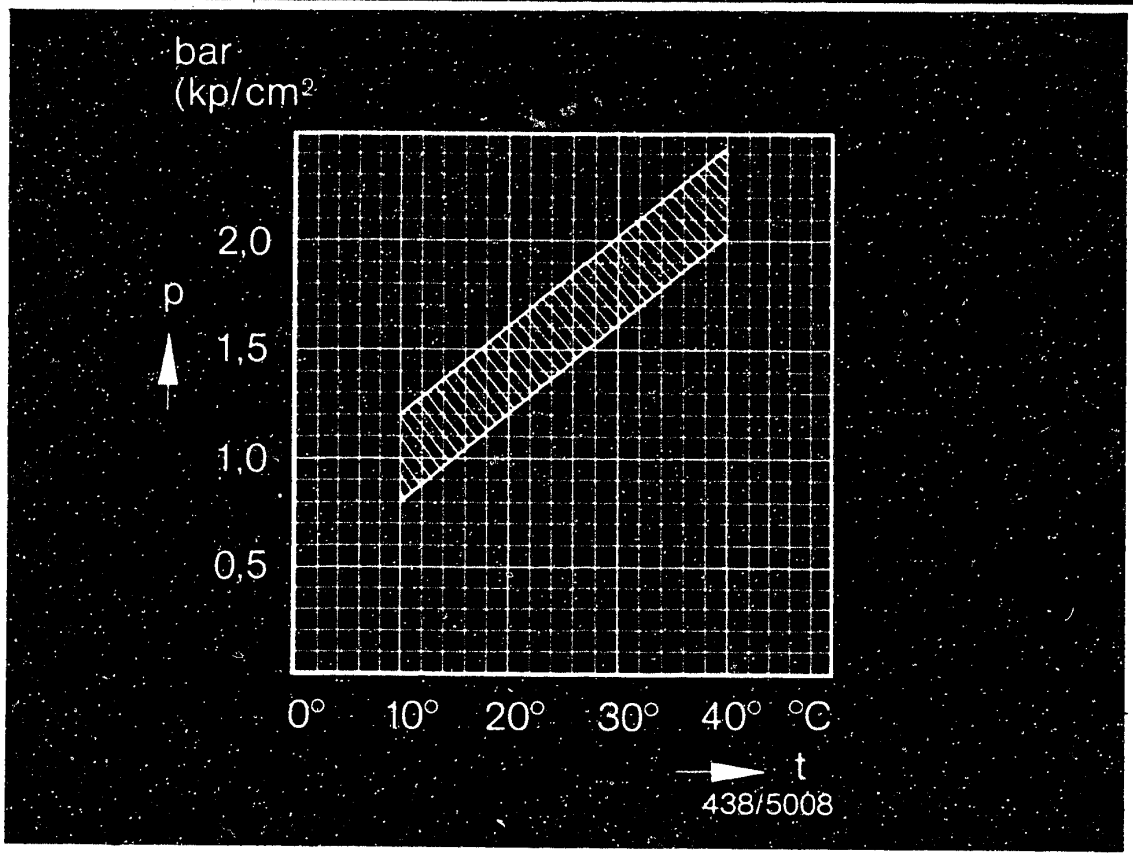
Open the valve screw of the directional-control valve (both screws in the case of KDEP 1034).

Switch on the electric fuel pump by bridging the electrical safety circuit.



For this test it is necessary to use a vacuum pump with pressure gauge. This is connected to the intake-manifold-pressure connection port of the warm-up regulator. The illustration shows testing with the recommended "Mityvac" hand vacuum pump.

Setting value: 510...550 mbar (385...415 torr)



p = Control pressure (gauge pressure)
t = Ambient temperature (°C)

Warm-up regulator Part No.: 0 438 140 056

The pressure gauge of the pressure tester indicates the "cold" control pressure.
Calculate the nominal control pressure in accordance with the ambient temperatures in the graph.
Example: Ambient temperature = 20°C
Nominal control pressure = 1.2...1.6 bar gauge pressure

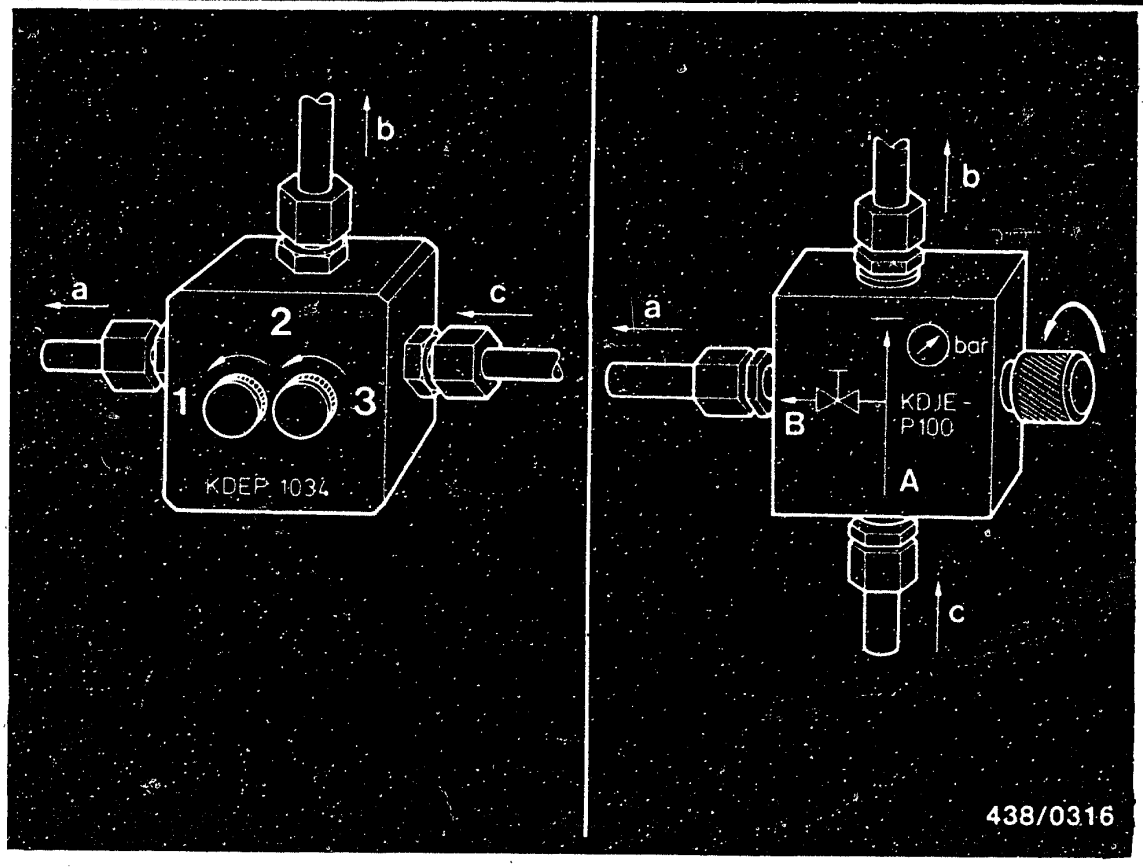
If the measured "cold" control pressure differs from the nominal value, this may be due to one of the following faults:

- Fuel delivery for the control-pressure circuit too low or too high. Check fuel delivery. Test specification: 160...240 cm^3/min.

- Fuel return from the warm-up regulator blocked or constricted (if control pressure too high). Eliminate constriction.

- Warm-up regulator defective. Replace warm-up regulator.

If the warm-up regulator has failed due to fouling, the new warm-up regulator must be provided with tube fitting 1 433 356 802. Tightening torque 20...22 Nm (2.0...2.2 kgfm).



a = To warm-up regulator
b = To pressure gauge
c = From fuel distributor

14.7 Checking the "warm" control pressure

The test is carried out with the engine switched off, once at atmospheric pressure, and once with a simulated intake-manifold vacuum at the full-load diaphragm.

Test procedure:

The temperature of the engine is not important.

Open the valve screw of the directional-control valve (both screws in the case of KDEP 1034).

Switch on the electric fuel pump by bridging the electrical safety circuit.

Attach the plug to the warm-up regulator.

Control pressure now rises (the warm-up regulator in the process of shutting off) until the "warm" control pressure is reached.

The "warm" control pressure is indicated on the pressure gauge of the pressure tester.

Test specification for "warm" control pressure (with atmospheric pressure), i.e. with the engine switched off:

up to FD 930	2.8...3.2 bar (2.9...3.3 kgf/cm²) gauge pressure
as of FD 931	2.6...3.0 bar (2.7...3.1 kgf/cm²) gauge pressure

If the measured "warm" control pressure differs from the test specification, this may be due to one of the following faults:

If control pressure too high:

- Fuel delivery for the control-pressure circuit too high.
Test fuel delivery. Test specification: 160...240 cm³/min.

- Fuel return from the warm-up regulator blocked or constricted.
Eliminate constriction.

- Warm-up regulator has hydraulic defect.
Replace warm-up regulator.
If the warm-up regulator has failed due to fouling, the new warm-up regulator must be provided with tube fitting 1 433 356 802. Tightening torque 20...22 Nm (2.0...2.2 kgfm).

If control pressure too low:

- Power supply open-circuit.
Eliminate open circuit. Ensure that the plug is contacting properly.

- Battery voltage too low, voltage drop.
Eliminate voltage drop. Minimum voltage at connector: 11.5 V.
If necessary, repeat test with engine running in order to obtain the normal generator voltage of approx. 14 V when the vehicle is in operation.

- Fuel delivery for the control-pressure circuit too low.
Check fuel delivery, test specification: 160...240 cm³/min.

- Warm-up regulator defective. Heating coil open-circuit. Hydraulic defect.
Replace warm-up regulator.

In order to test the full-load control pressure a vacuum must be applied to the warm-up regulator.

Test procedure for full-load control pressure:

The electric fuel pump remains switched on, the electric plug on the warm-up regulator remains connected.

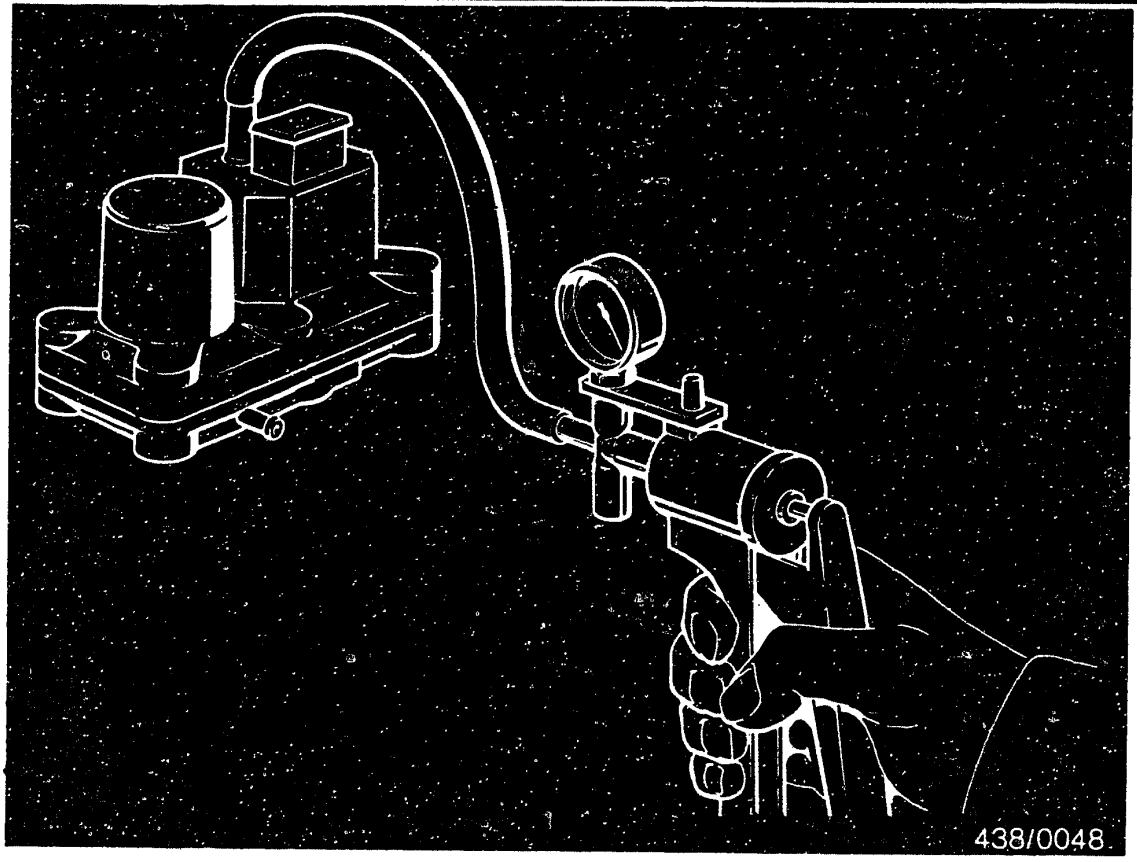
Connect the "Mityvac" hand vacuum pump to the intake-manifold-pressure connection port of the warm-up regulator and build up a vacuum.
Setting value: 510...550 mbar
(385...415 torr).

Test specification for "warm" control pressure (with intake-manifold pressure):
3.4...3.8 bar gauge pressure
(3.5...3.9 kgf/cm²)

If the measured "warm" full-load control pressure differs from the test specification, replace the warm-up regulator.

When the warm-up regulator has been replaced or a fault has been remedied, carry out the idle adjustment with the engine at normal operating temperature.

Idle adjustment is described on Coordinate F 13.



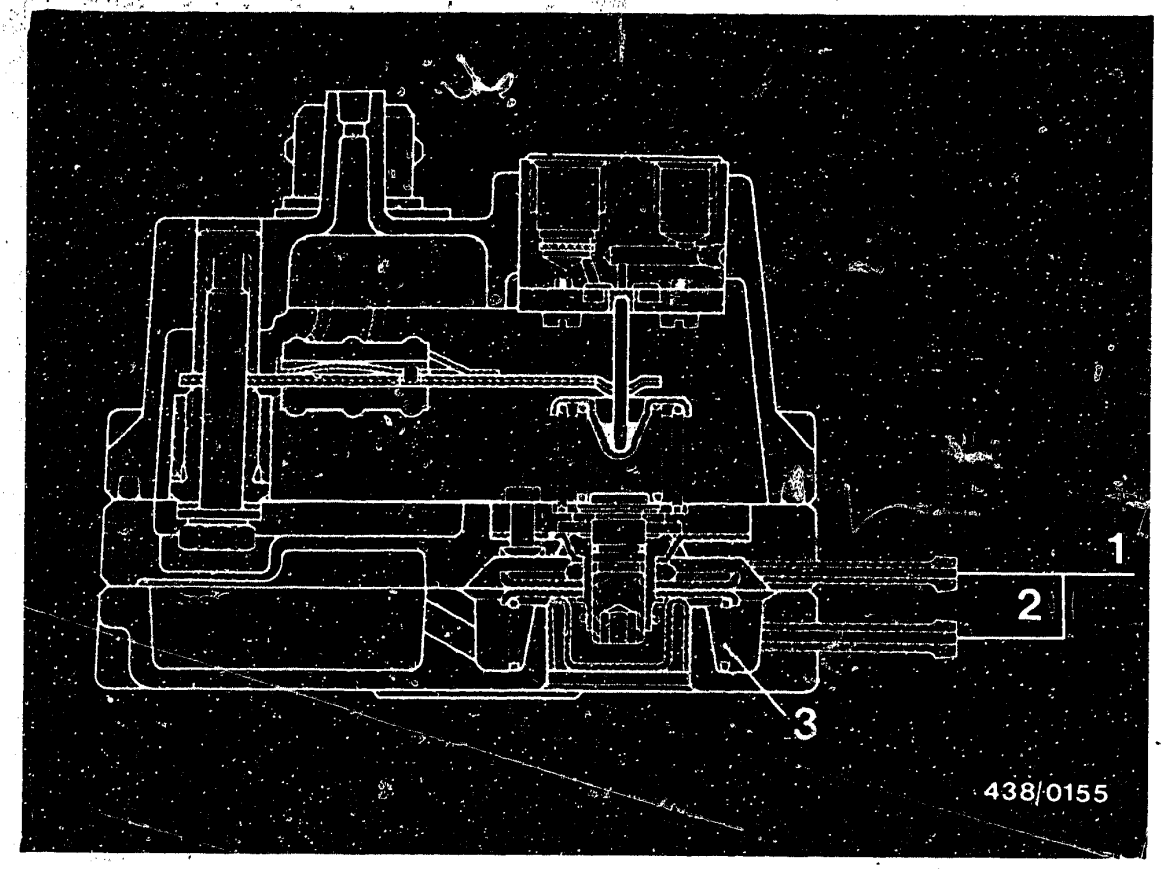
• Checking the full-load diaphragm for leaks

Switch off the electric fuel pump.

Connect the "Mityvac" hand vacuum pump to the intake-manifold-pressure connection port of the warm-up regulator and build up a vacuum.
Setting value: 510...550 mbar (385...415 torr).

Test specification for air leaks:
Max. pressure drop within 15 sec 100 mbar (75 torr).
If the pressure drop is too high, replace the warm-up regulator.

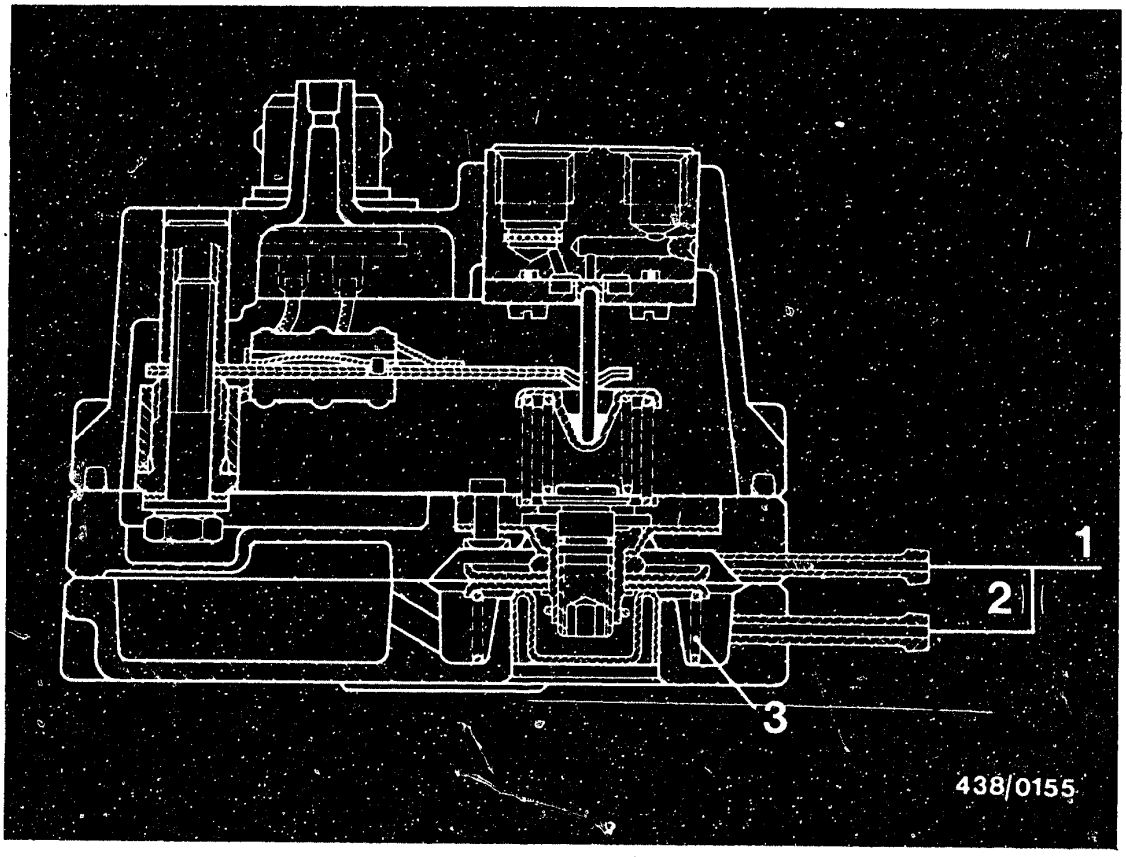
When the warm-up regulator has been replaced or a fault in the control-pressure circuit remedied, carry out the idle adjustment with the engine at normal operating temperature.
Idle adjustment is described on Coordinate F 13.



1 = Intake-manifold-pressure connection port
2 = Restriction (fixed restriction)
3 = Helical compression spring

14.8 Checking the control pressure - warm-up regulator 0438 140 068 (version for intake-manifold-dependent acceleration enrichment)

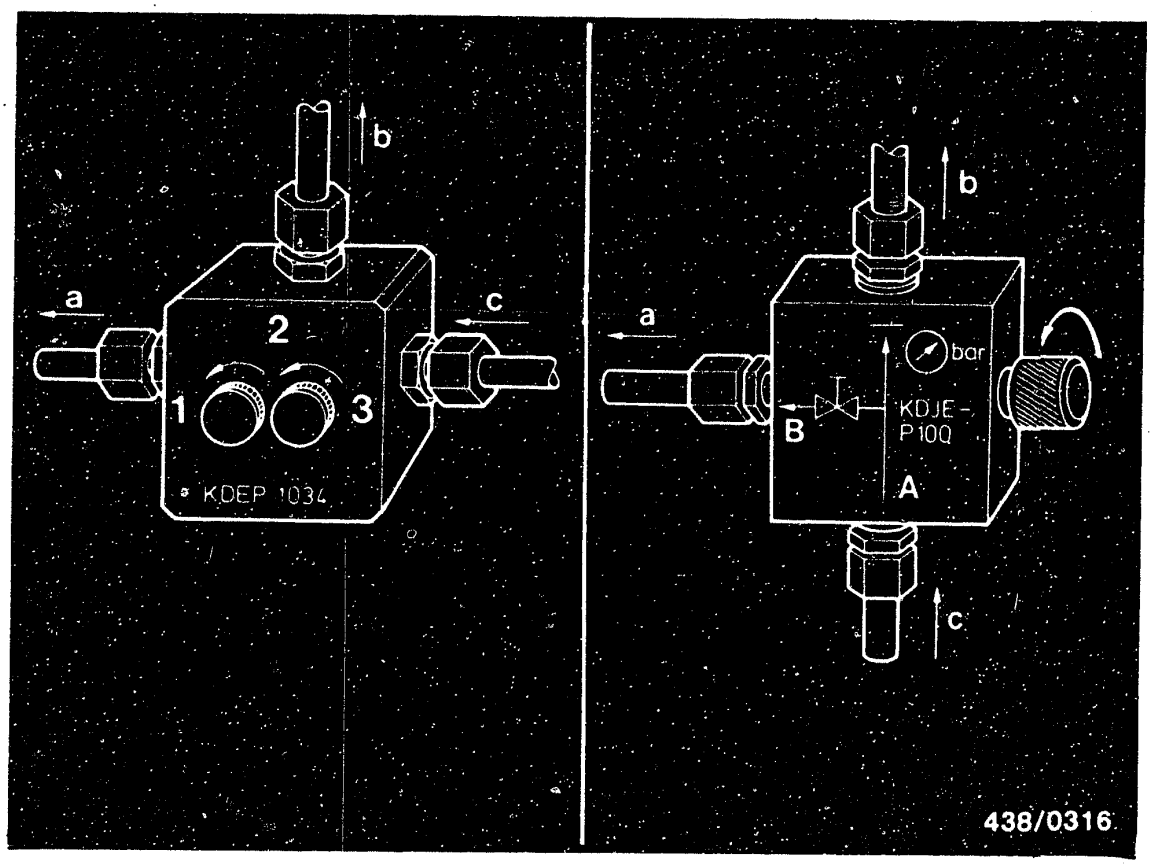
Operation: The construction of the warm-up regulator is largely the same as the version for full-load enrichment. The bottom part of the housing has an additional helical compression spring (3) which forces the diaphragm assembly against the upper stop. The action of the additional spring regulates the normal control pressure with the position of the throttle valve constant (3.6 bar gauge pressure with the warm-up regulator shut off).



1 = Intake-manifold-pressure connection port
2 = Restriction (fixed restriction)
3 = Helical compression spring

During acceleration there is a rapid pressure rise in the upper chamber while the pressure rises slowly in the lower chamber.
While there is this difference in pressure the diaphragm is forced against the lower stop by the force of the spring (3) and thus the control pressure is reduced to a given value for a richer mixture.

Important note:
The fixed restriction must not be exchanged, and the hose line between the fixed restriction and the lower chamber of the warm-up regulator must not be shortened or exchanged for hose lines of other dimensions.



a = To warm-up regulator
b = To pressure gauge
c = From fuel distributor

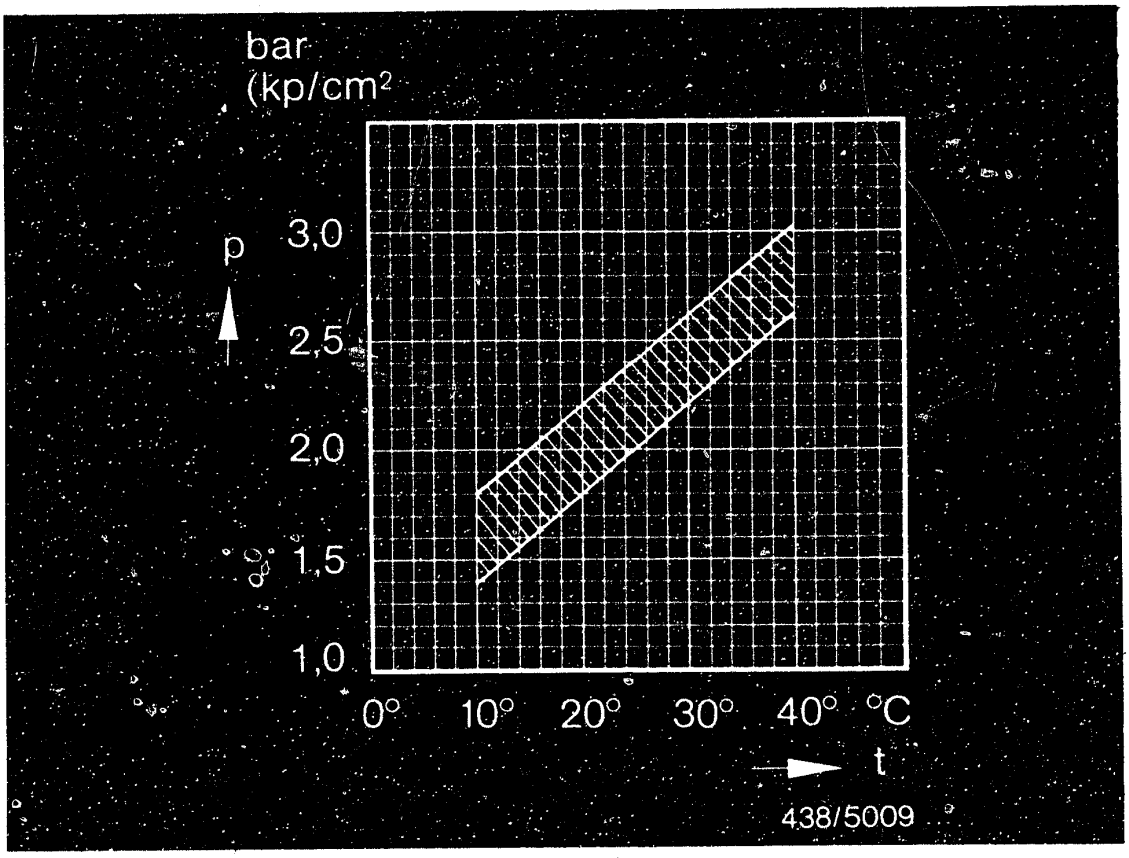
14.9 Testing the "cold" control pressure

The test is performed with the engine switched off, i.e. without the application of pressure from the intake manifold.
The engine must be cold. For this purpose, the engine should have been switched off for several hours, preferably overnight.

Pull off the plug from the warm-up regulator.

Open the valve screw of the directional-control valve (both screws in the case of KDEP 1034).

Switch on the electric fuel pump by bridging the electrical safety circuit.



p = Control pressure (gauge pressure)
t = Ambient temperature (°C)

Warm-up regulator Part No.: 0 438 140 068

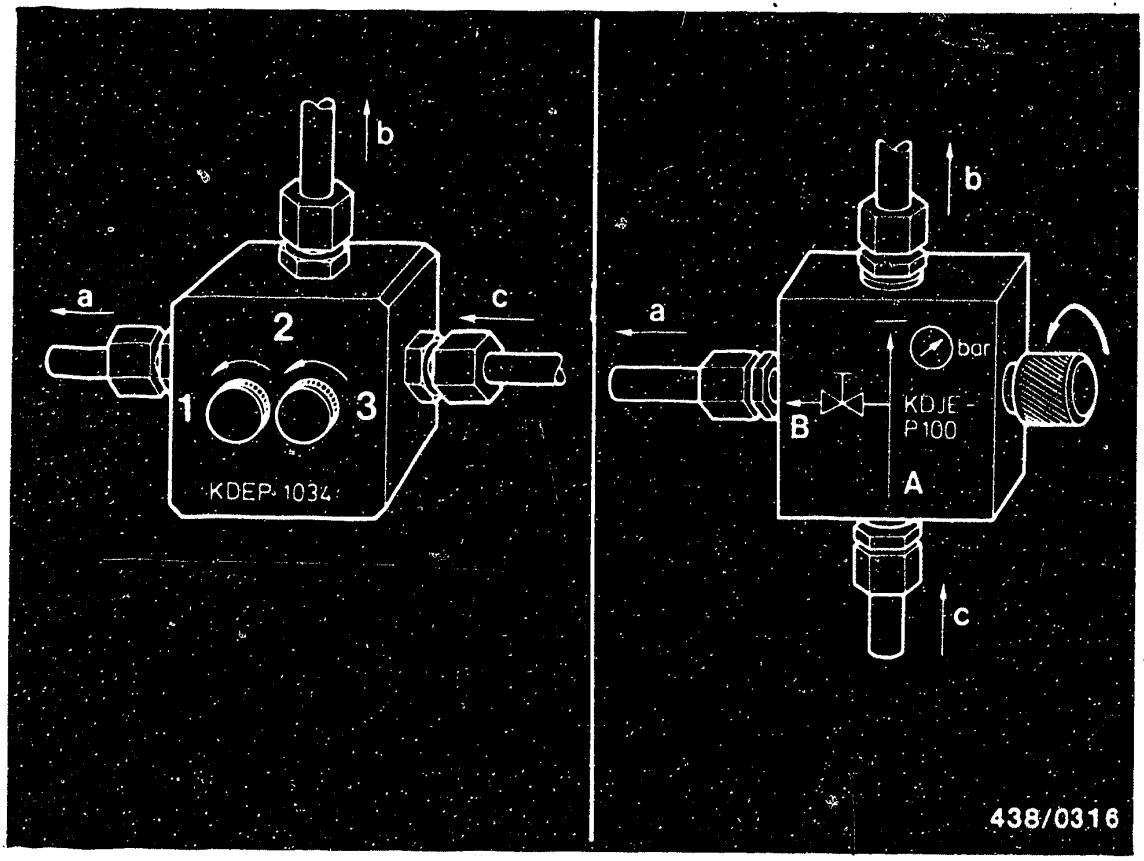
The pressure gauge of the pressure tester indicates the "cold" control pressure.
Calculate the nominal control pressure in accordance with the ambient temperatures in the graph.
Example: Ambient temperature = 20°C
Nominal control pressure = 1.8...2.2 bar gauge pressure

If the measured "cold" control pressure differs from the test specification, this may be due to one of the following faults:

- Fuel delivery for the control-pressure circuit too low or too high. Test fuel delivery. Test specification: 160...240 cm^3/min.

- Fuel return from the warm-up regulator blocked or constricted (if control pressure too high).
Eliminate constriction.

- Warm-up regulator defective. Replace warm-up regulator.
If the warm-up regulator has failed due to fouling, the new warm-up regulator must be provided with tube fitting 1 433 356 802. Tightening torque 20...22 Nm (2.0...2.2 kgfm).



a = To warm-up regulator
b = To pressure gauge
c = From fuel distributor

14.10 Checking the "warm" control pressure

The test is carried out with the engine switched off, once at atmospheric pressure, and once with simulated intake-manifold vacuum at the lower chamber.

Test procedure:

The temperature of the engine is not important.

Open the valve screw of the directional-control valve (both screws in the case of KDEP 1034).

Switch on the electric fuel pump by bridging the electrical safety circuit.

Attach the plug to the warm-up regulator.

Control pressure now rises (the warm-up regulator in the process of shutting off) until the "warm" control pressure is reached.

The "warm" control pressure is indicated on the pressure gauge of the pressure tester.

Test specification for "warm" control pressure (with atmospheric pressure), i.e. with the engine switched off:

3.4...3.8 bar (3.5...3.9 kgf/cm²) gauge pressure

If the measured "warm" control pressure differs from the test specification, this may be due to one of the following faults:

If control pressure too high:

- Fuel delivery for the control-pressure circuit too high.
Test fuel delivery, test specification: 160...240 cm³/min.

- Fuel return from the warm-up regulator blocked or constricted.
Eliminate constriction.

- Warm-up regulator has hydraulic defect.
Replace warm-up regulator.
If the warm-up regulator has failed due to fouling, the new warm-up regulator must be provided with tube fitting 1 433 356 802. Tightening torque 20...22 Nm (2.0...2.2 kgfm).

If control pressure too low:

- Power supply open-circuit.
Eliminate open circuit. Ensure that the plug is contacting properly.

- Battery voltage too low, voltage drop.
Eliminate voltage drop. Minimum voltage at connector: 11.5 V.
If necessary, repeat test with engine running in order to obtain the normal generator voltage of approx. 14 V when the vehicle is in operation.

- Fuel delivery for the control-pressure circuit too low.
Test fuel delivery, test specification: 160...240 cm³/min.

- Warm-up regulator defective. Heating coil open-circuit. Hydraulic defect.

Replace warm-up regulator.

In order to test the control pressure for acceleration enrichment a vacuum must be applied to the warm-up regulator.

Test procedure for acceleration enrichment:

The electric fuel pump remains switched on, the electric plug on the warm-up regulator remains connected.

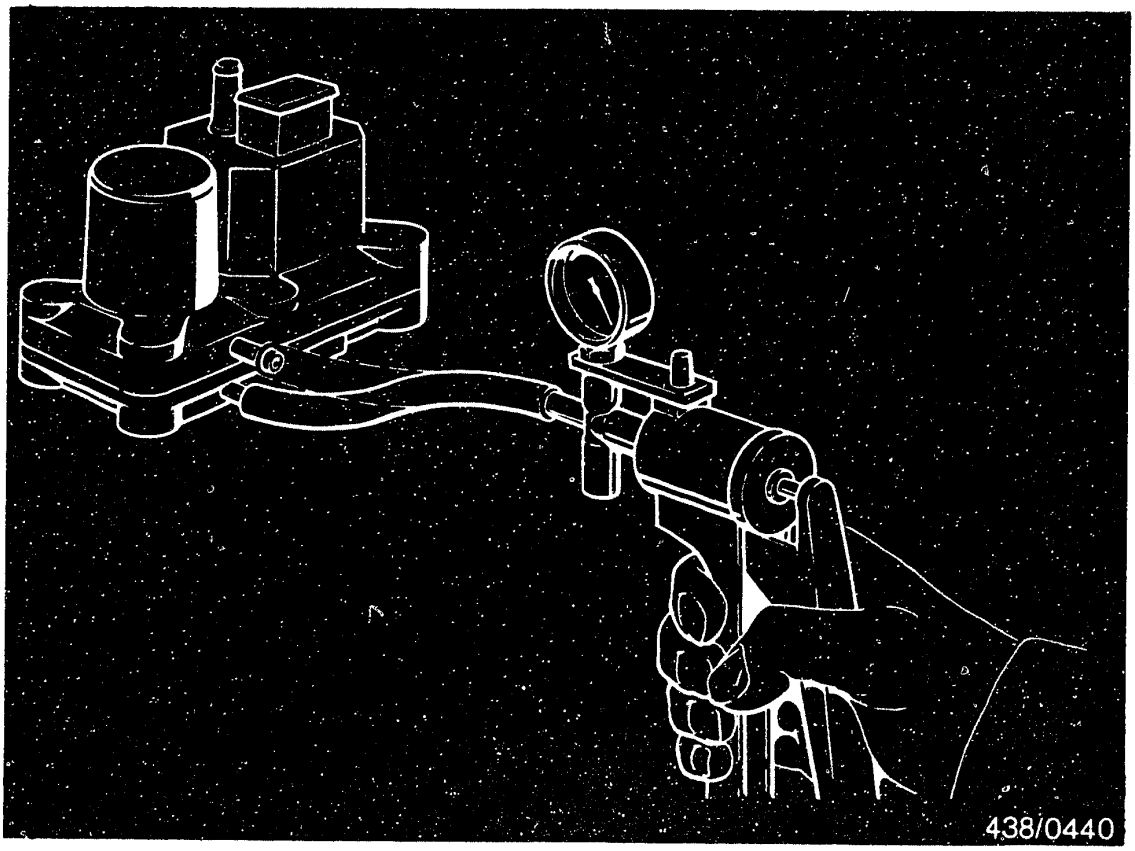
Connect the "Mityvac" hand vacuum pump to the intake-manifold-pressure connection port of the lower chamber of the warm-up regulator and build up a vacuum.
Setting value: 450...550 mbar
(385...415 torr).

Test specification for "warm" control pressure for acceleration enrichment (with intake-manifold pressure at the lower chamber):
1.4...1.8 bar (1.5...1.9 kgf/cm²) gauge pressure

If the measured "warm" control pressure for acceleration enrichment differs from the test specification, replace the warm-up regulator.

When the warm-up regulator has been replaced or a fault remedied, carry out the idle adjustment with the engine at normal operating temperature.

Idle adjustment is described on Coordinate F 13.



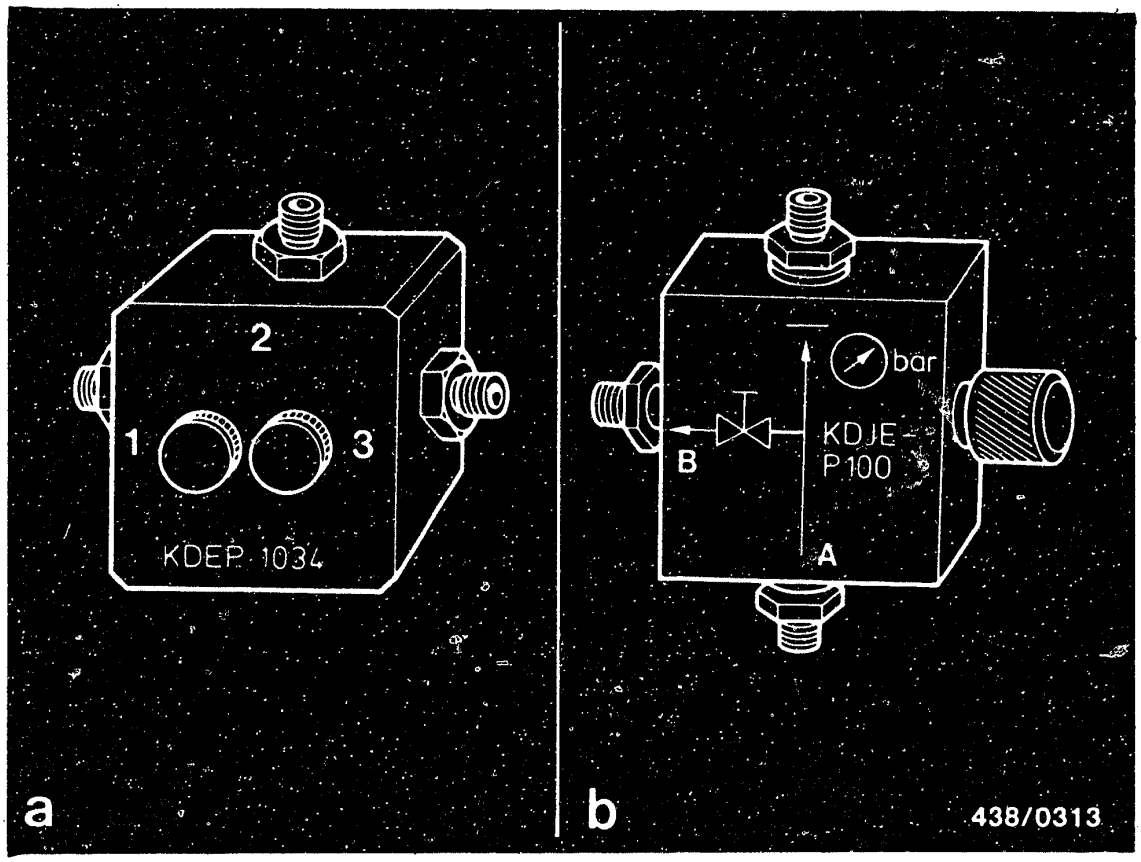
• Checking the two acceleration enrichment chambers for leaks

Switch off the electric fuel pump.

Connect the "Mityvac" hand vacuum pump to the intake-manifold-pressure connection port on the lower chamber, and then to the upper chamber, and build up a vacuum. Setting value: 450...550 mbar (340...415 torr).

Test specification for air leaks on both chambers: Max. pressure drop within 15 sec. 100 mbar (75 torr). If the pressure drop is too high, replace the warm-up regulator.

When the warm-up regulator has been replaced or a fault in the control-pressure circuit remedied, carry out the idle adjustment with the engine at normal operating temperature.
Idle adjustment is described on Coordinate F 13.



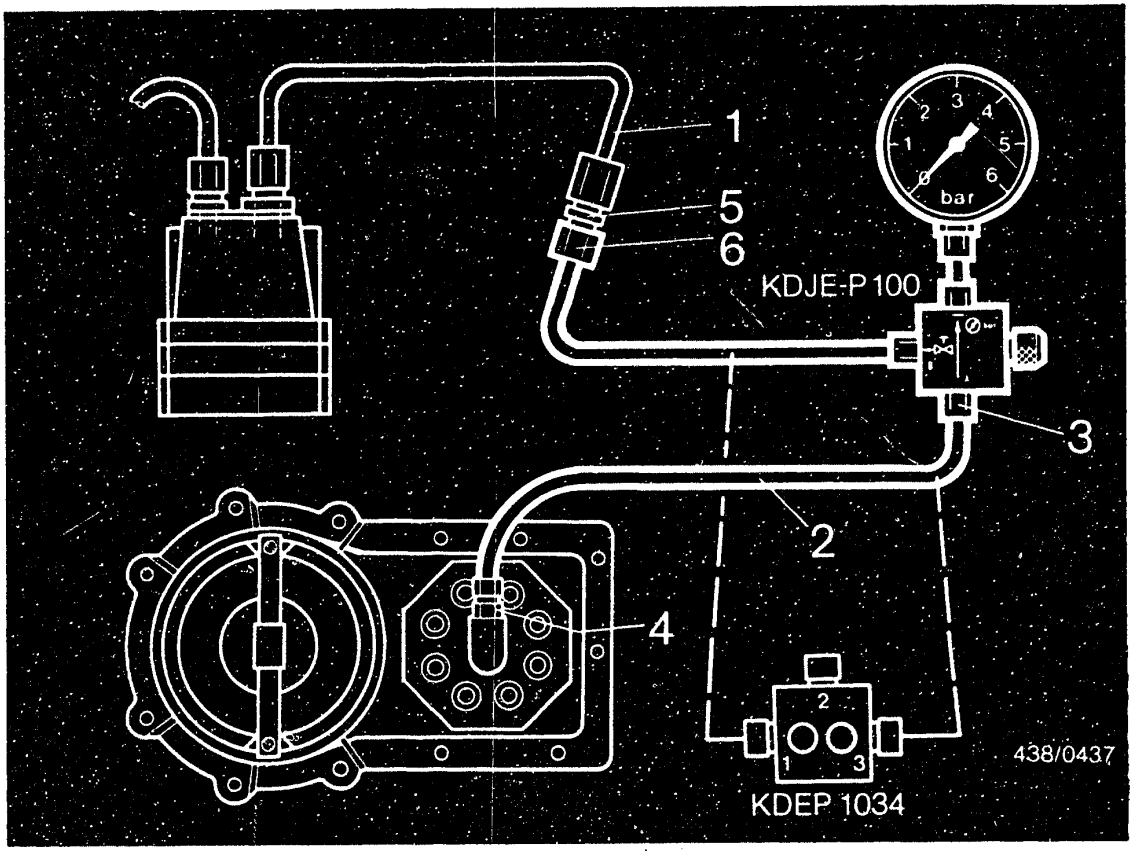
15. Testing and adjusting the primary (system) pressure:

15.1 Mounting the pressure tester KDJE-P100 (formerly KDEP 1034):

The pressure tester KDEP 1034 is equipped with a three-way valve with 2 separate valve screws. The connections of the directional-control valve are numbered (Fig. a). Since the end of 1979 the pressure tester KDJE-P100 has been supplied. Its directional-control valve has only one valve screw (Fig. b). The connections of this directional control valve are identified by symbols:

A = Inlet (from the fuel distributor)
B = Outlet (to the warm-up regulator)

Caution: When the directional-control valve is not in use, always keep the valve screw(s) open in order to relieve the pressure on the seal rings.



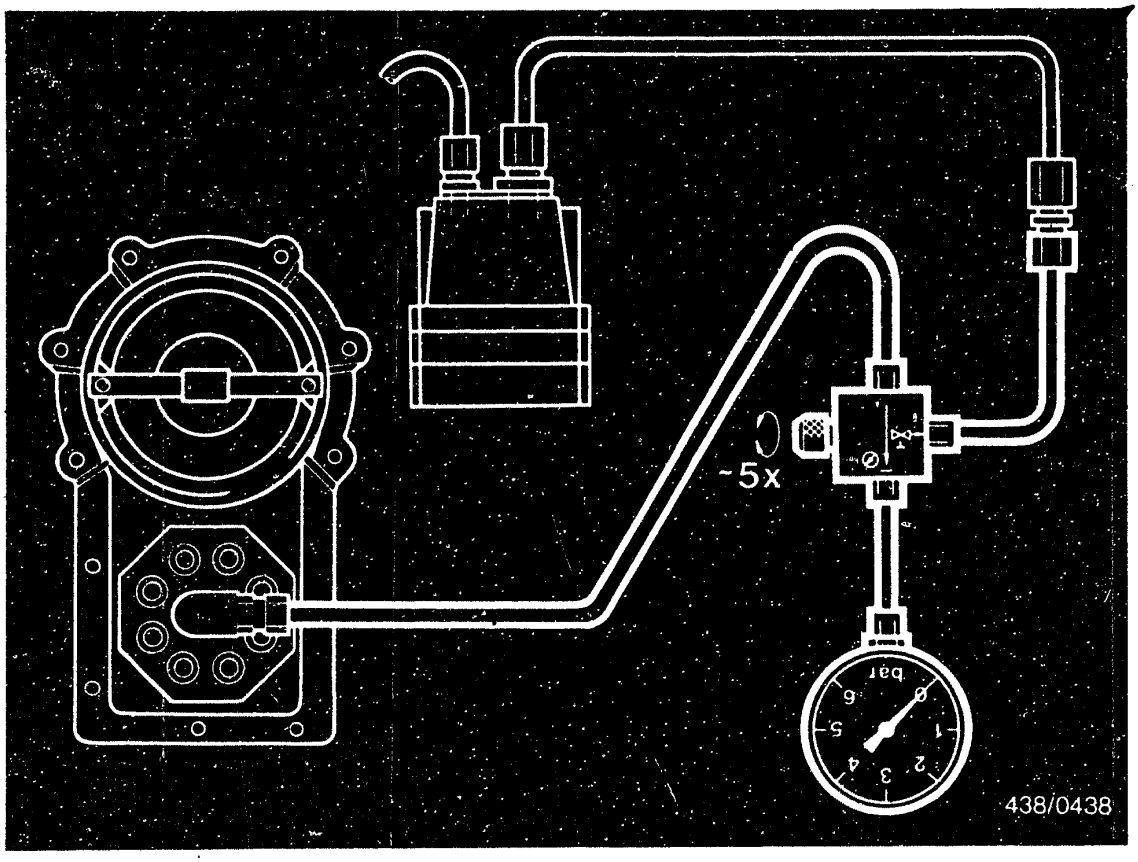
The directional-control valve is connected into the control-pressure line from the fuel distributor to the warm-up regulator:

The connecting-parts set KDJE-P100/11 (formerly KDEP 1034/11) is additionally required.

Unscrew the control-pressure line (1) from the fuel distributor. Connect the connecting hose KDJE-P100/11/1 (2) to the inlet fitting (3) of the directional-control valve and connect to control-pressure connection port (4) of the fuel distributor.

Screw double fitting (5) of the connecting-parts set into hose end (6) of directional-control valve and connect to control-pressure line (1).
Steel tubing of control-pressure line must not be bent!

Hang the pressure gauge from the hood (possibly using wire hook).



15.2 Bleeding the pressure tester

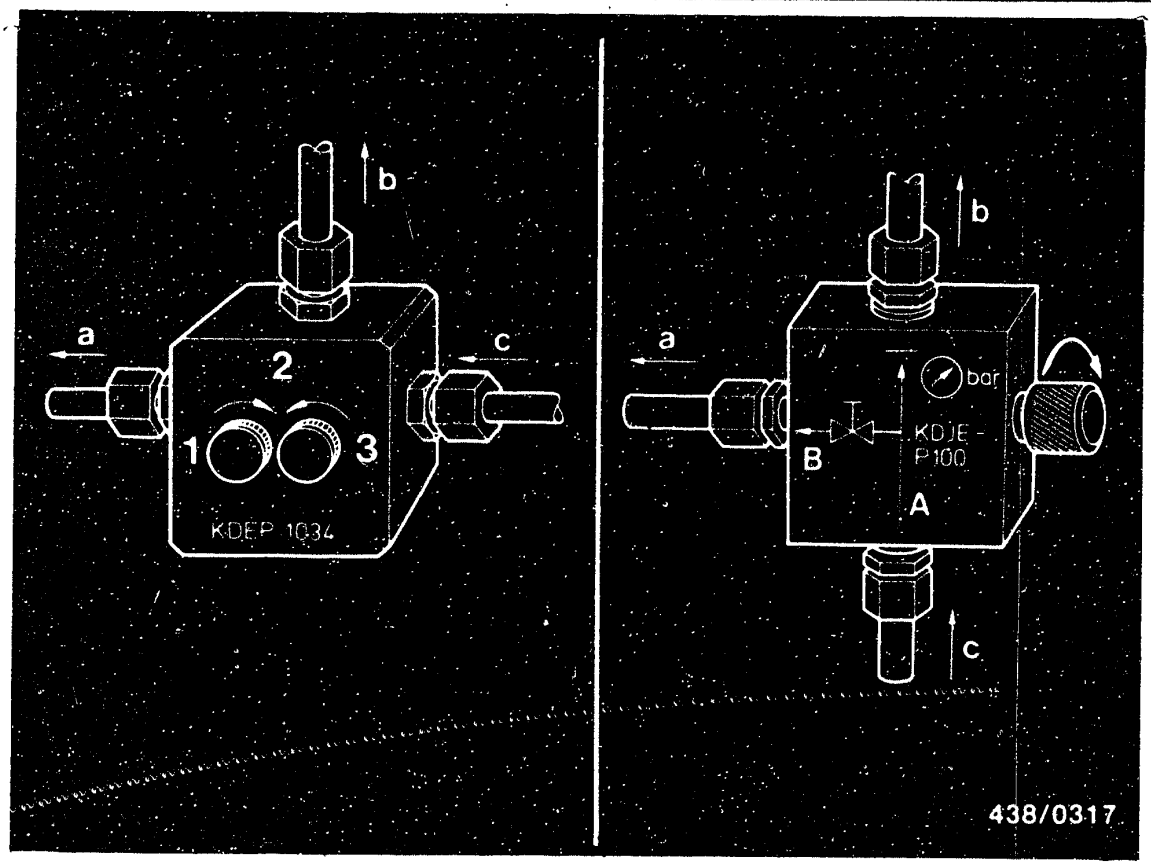
Disconnect the electric plug from the warm-up regulator. Let the pressure gauge hang down (hose fully extended).

Switch on the electrical fuel pump by bridging the electrical safety circuit.

Open and close the valve screw(s) of the directional-control valve in a 10-second rhythm about 5 times.

Then hang the pressure gauge from a suitable support (e.g. from one of the struts under the engine hood).

Open valve screw of directional-control valve (both screws in the case of KDEP 1034) (turning to the left).



a = To warm-up regulator
b = To pressure gauge
c = From fuel distributor

15.3 Testing the primary pressure:

The test is performed with the engine switched off.
The temperature of the engine is not important.
Close the valve screw of directional-control valve KDJE-P100.
In the case of KDEP 1034, close valve screw 1, open valve screw 3.

Switch on the electric fuel pump by bridging the electrical safety circuit.
The pressure gauge now indicates the primary pressure.

Fuel distributor Part No.	Test specifications - primary pressure
0 438 100 041 0 438 100 068 0 438 100 087 0 438 100 088 0 438 100 089	4.7...5.4 bar (4.8...5.5 kgf/cm²) gauge pressure
0 438 100 012 0 438 100 034	5.0...5.6 bar (5.1...5.7 kgf/cm²) gauge pressure

Possible causes for too low a primary pressure:

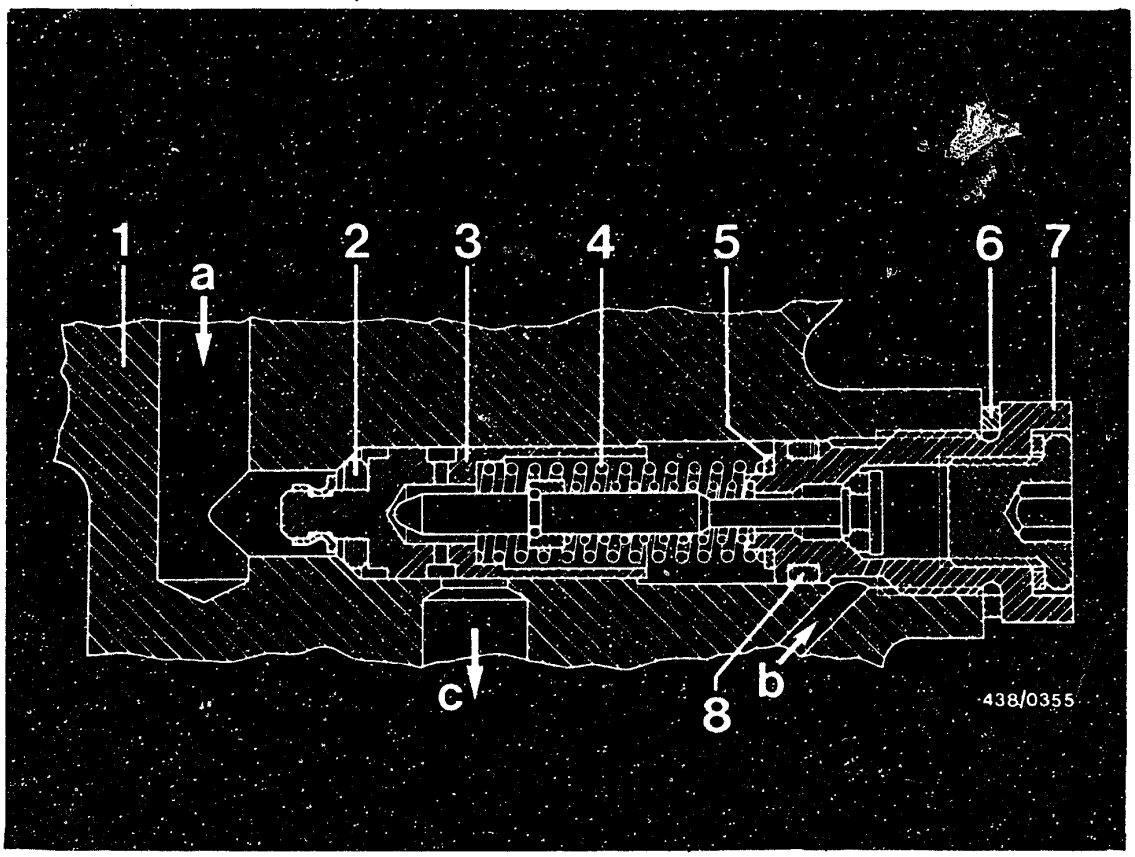
- Fuel supply faulty.
(Delivery of electric fuel pump too low).

- Primary pressure set incorrectly.
A precondition for readjustment of the primary pressure is always that the fuel supply is in order.
Test specification: 3.5 l; 3.8 l engine at least 1000 cm³/30 s.
4.5 l; 5.0 l engine at least 1100 cm³/30 s

Possible causes for too high a primary pressure:

- A restriction in the return line leading to the fuel tank.

- Primary-pressure regulator set incorrectly.
For this reason, before readjusting too high a primary pressure, always first check the condition of the return line leading to the fuel tank.



a = Primary pressure
b = From warm-up regulator
c = Fuel return
1 = Fuel-distributor housing
2 = Shaped ring (formerly O-ring)
3 = Control piston
4 = Control spring
5 = Shim(s)
6 = Flat seal ring
7 = Screw plug
8 = O-ring

15.4 Adjusting the primary pressure:

Primary-pressure adjustment values:

Fuel distributor Part No.	Adjustment values - primary pressure
0 438 100 041 0 438 100 068 0 438 100 087 } 0 438 100 088 0 438 100 089	4.9...5.1 bar (5.0...5.2 kgf/cm²) gauge pressure

Primary-pressure adjustment values:

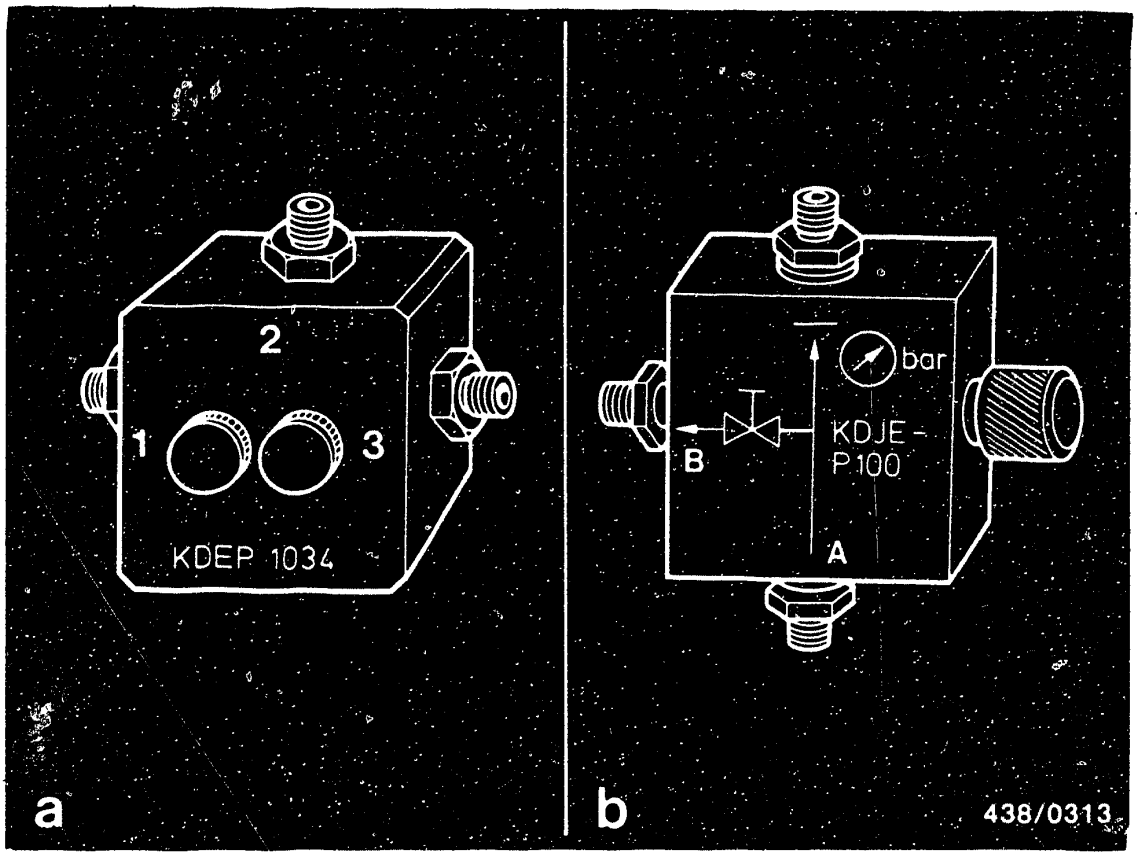
Fuel distributor Part No.	Adjustment values - primary pressure
0 438 100 012 0 438 100 034 }	5.2...5.4 bar (5.3...5.5 kgf/cm²) gauge pressure

The primary pressure is readjusted by replacing the shims (Item 5).

Note:
0.1 mm more of shim thickness means about 0.15 bar pressure increase and vice versa.

To do this, screw out the large screw plug (Item 7) together with the push valve. After carrying out the adjustment, always fit the screw plug with a new flat seal ring (Item 6) and O-ring (Item 8).

The control piston (Item 3) of the primary-pressure regulator must not be lost. It was matched specially to the fuel distributor housing in the manufacturing plant and therefore is the only part of the primary-pressure regulator which must not be replaced.



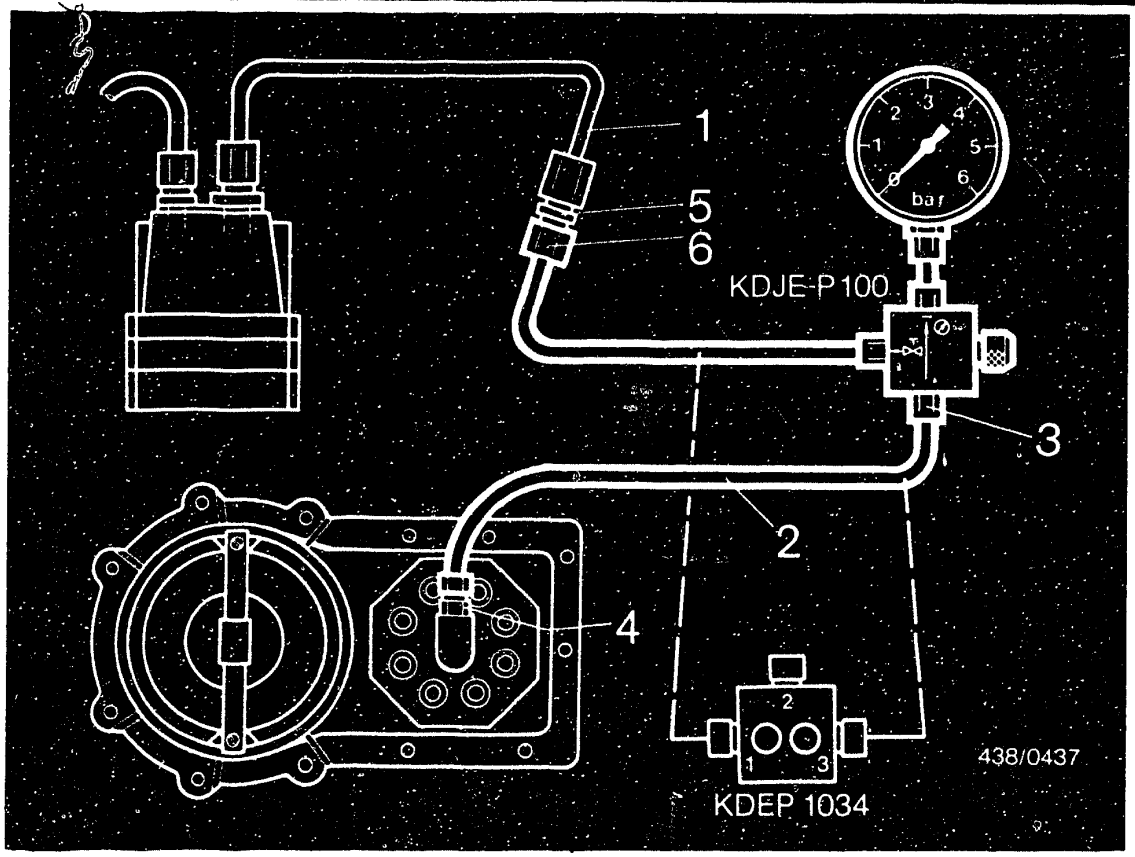
16. Testing the entire fuel system for leaks.

16.1 Mounting the pressure tester KDJE-P100 (formerly KDEP 1034):

The pressure tester KDEP 1034 is equipped with a three-way valve with 2 separate valve screws. The connections of the directional-control valve are numbered (Fig. a). Since the end of 1979 the pressure tester KDJE-P100 has been supplied. Its directional-control valve has only one valve screw (Fig. b). The connections of this directional control valve are identified by symbols:

A = Inlet (from the fuel distributor)
B = Outlet (to the warm-up regulator)

Caution: When the directional-control valve is not in use, always keep the valve screw(s) open in order to relieve the pressure on the seal rings.



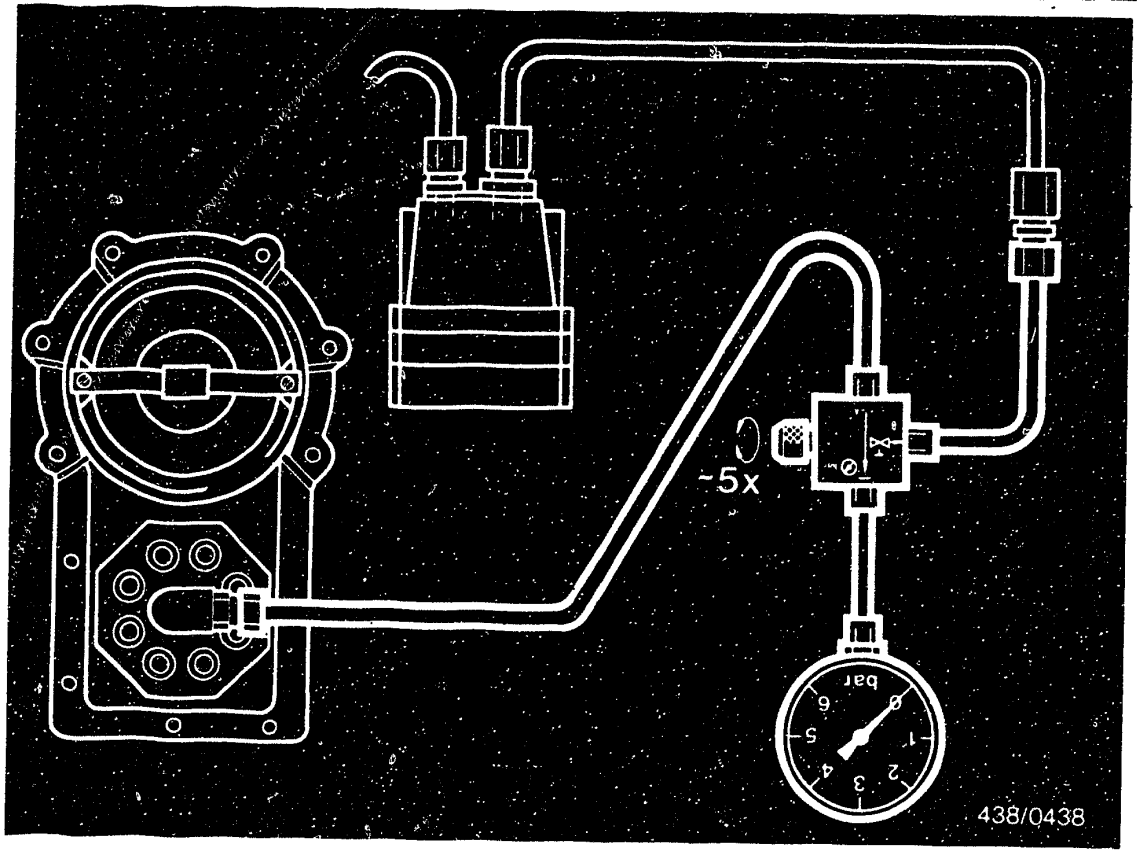
The directional-control valve is connected into the control-pressure line from the fuel distributor to the warm-up regulator:

The connecting-parts set KDJE-P100/11 (formerly KDEP 1034/11) is additionally required.

Unscrew the control-pressure line (1) from the fuel distributor. Connect the connecting hose KDJE-P100/11/1 (2) to the inlet fitting (3) of the directional-control valve and connect to control-pressure connection port (4) of the fuel distributor.

Screw double fitting (5) of the connecting-parts set into hose end (6) of directional-control valve and connect to control-pressure line (1).
Steel tubing of control-pressure line must not be bent!

Hang the pressure gauge from the hood (possibly using wire hook).



16.2 Bleeding the pressure tester

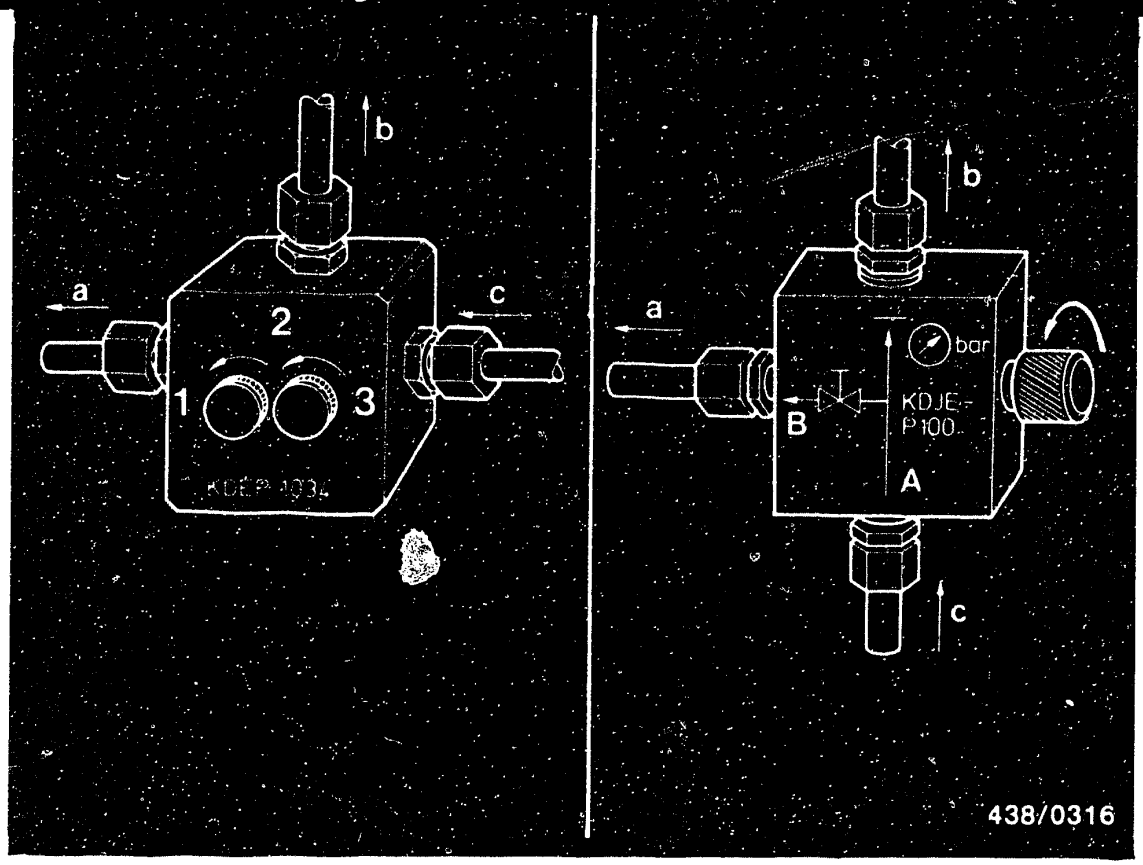
Disconnect the electric plug from the warm-up regulator. Let the pressure gauge hang down (hose fully extended).

Switch on the electric fuel pump by bridging the electrical safety circuit.

Open and close the valve screw(s) of the directional-control valve in a 10-second rhythm about 5 times.

Then hang the pressure gauge from a suitable support (e.g. from one of the struts under the engine hood).

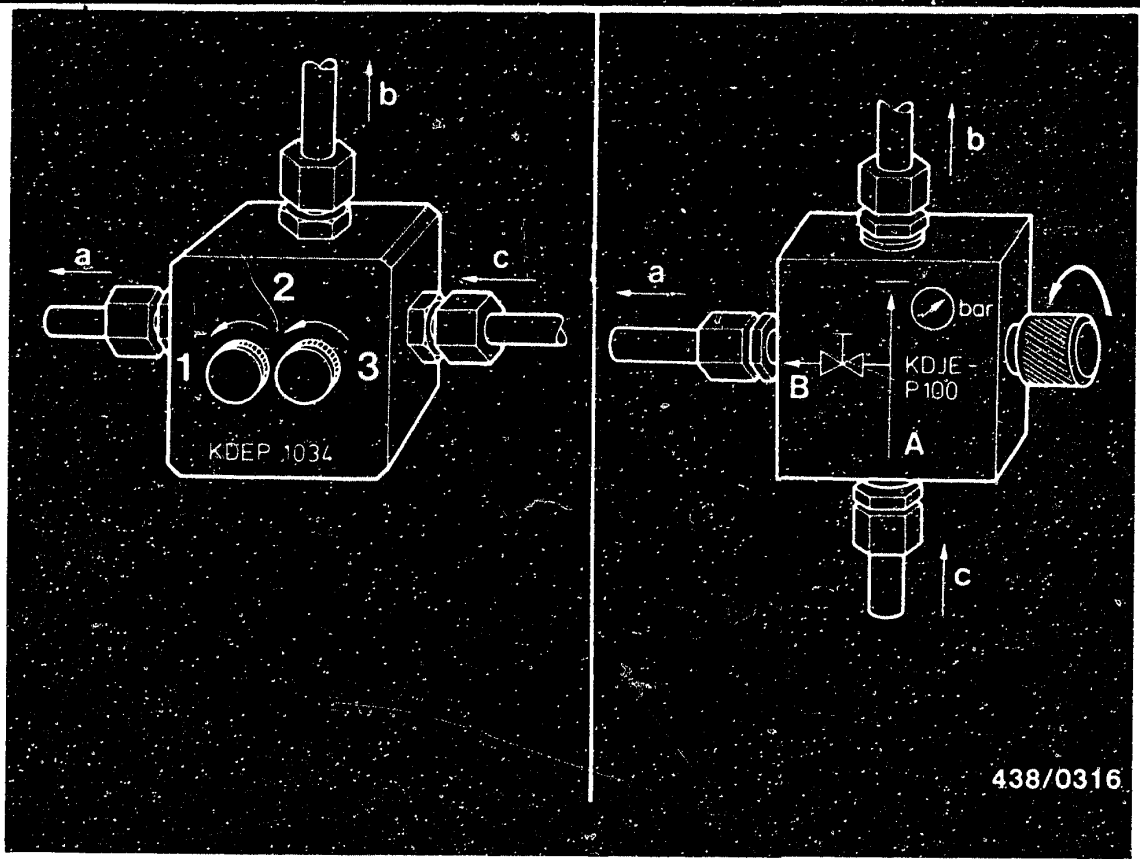
Open valve screw of directional-control valve (both screws in the case of KDEP 1034) (turning to the left).



a = To warm-up regulator
b = To pressure gauge
c = From fuel distributor

16.3 Leak test

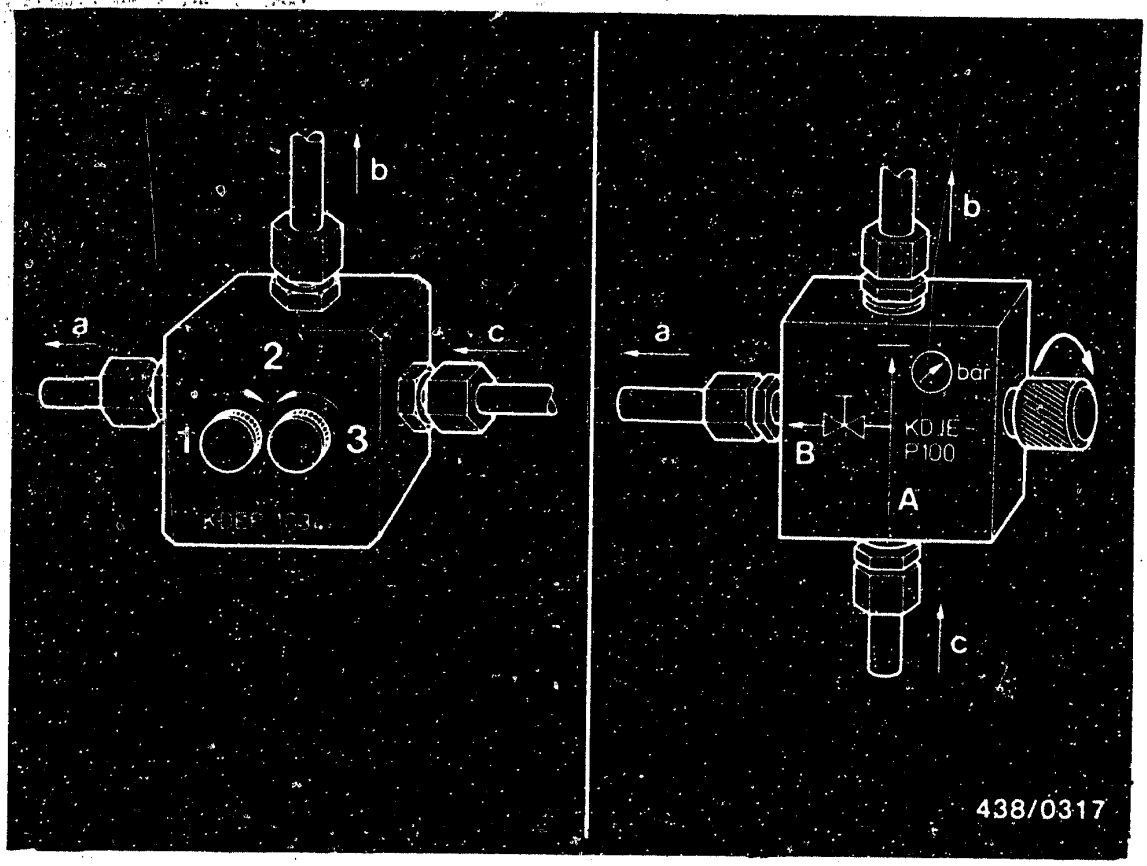
The test is performed with the engine switched off. Make the test with a warm engine but not immediately after the engine has been operated at a high temperature. Open the valve screw of the directional-control valve (both valves in the case of KDEP 1034).



Switch on the electric fuel pump by bridging the electrical safety circuit until the warm-up regulator has ceased to operate ("warm" control pressure).

Switch the electric fuel pump off again and observe the drop in pressure on the pressure gauge.

Test specifications for leak test:
Minimum pressure after:
10 minutes: 2.7 bar (2.8 kgf/cm²) gauge pressure
20 minutes: 2.6 bar (2.7 kgf/cm²) gauge pressure



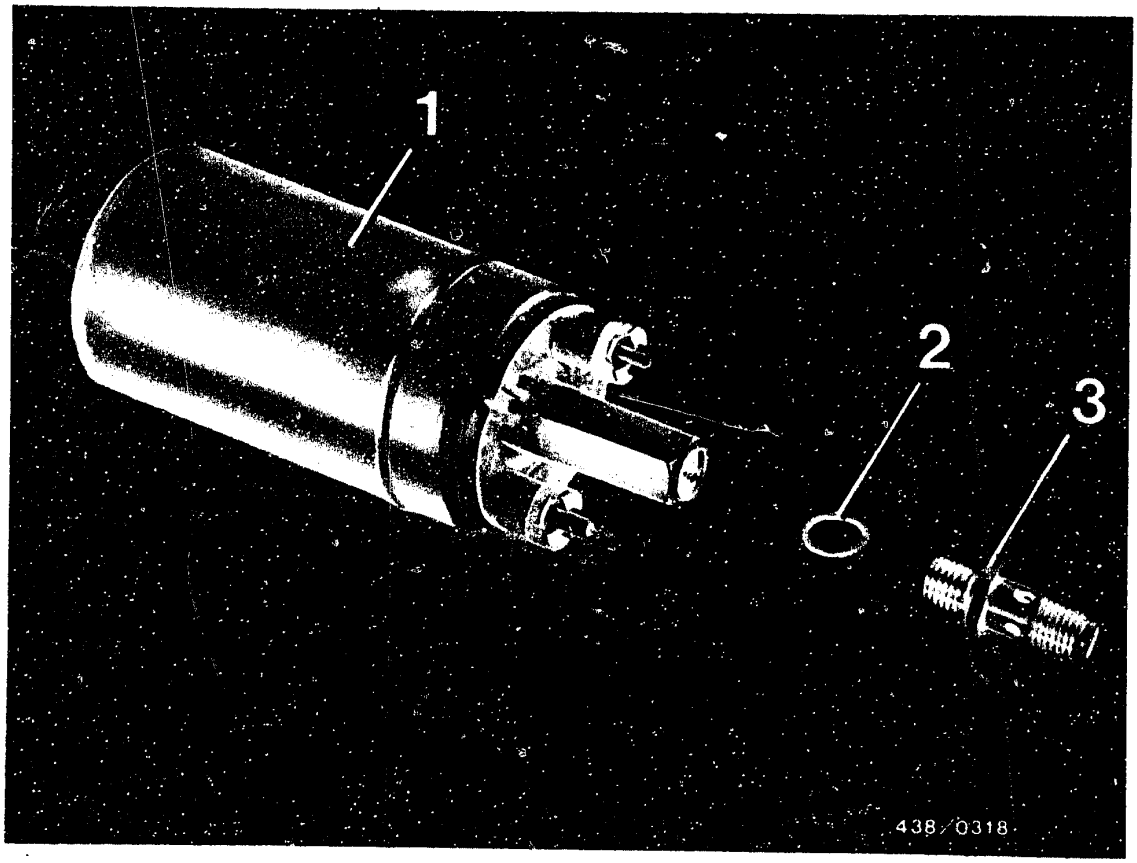
a = To warm-up regulator
b = To pressure gauge
c = From fuel distributor

If the pressure drops too quickly, repeat the test with the control-pressure circuit disconnected.

Position of the valve screws:
Close the valve screw of the directional-control valve KDJE-P100. In the case of KDEP 1034, close valve screw 1, open valve screw 2.

If the same result is found, the leak is in the primary-pressure circuit.

If the test results are correct during the second test, the leak is in the control-pressure circuit.



1 = Electric fuel pump
2 = Flat seal ring
3 = Tube fitting

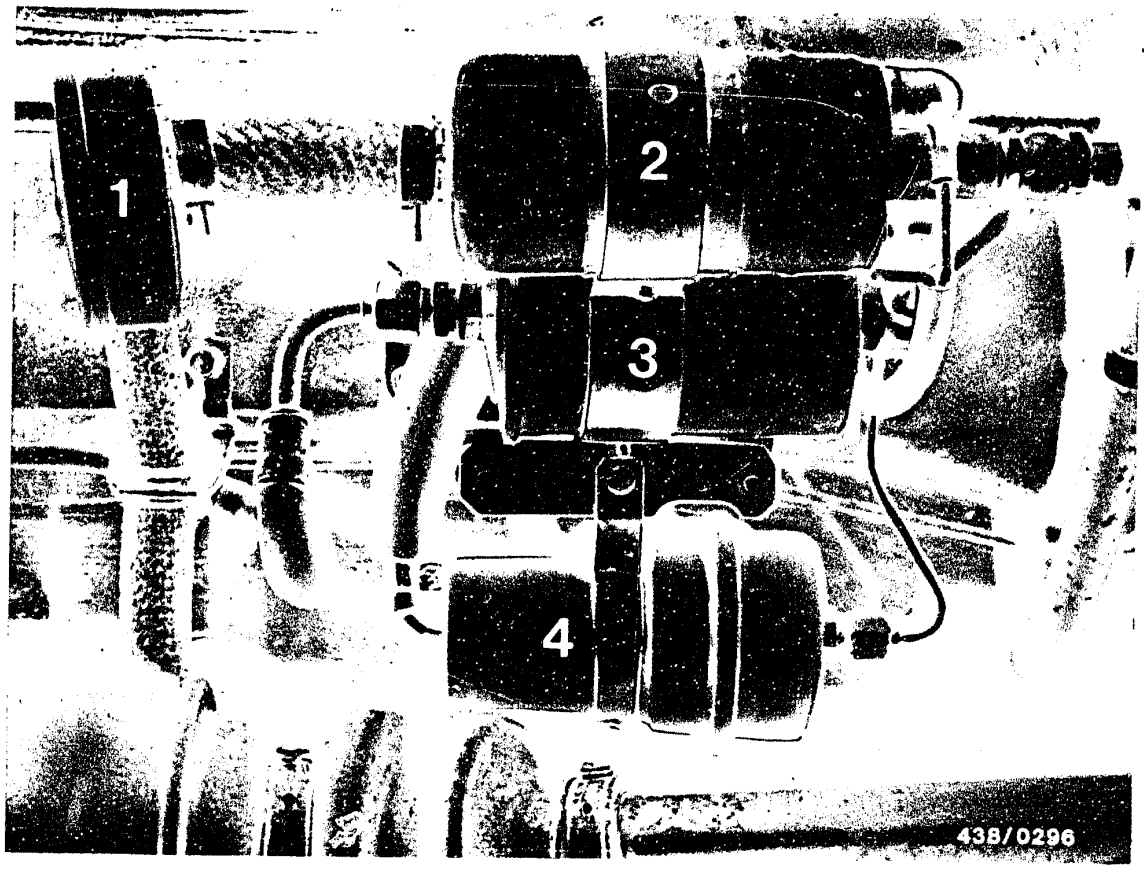
16.4 Possible causes of a defect in the primary-pressure circuit:

- Non-return valve of the electric fuel pump has a leak.

Part No. of electric fuel pump 0 580 254 973
0 580 254 974

The non-return valve is built into the tube fitting. If necessary, replace the tube fitting (part no.) 1 583 386 016).

Electric fuel pump Part No. 0 580 254 975
The non-return valve is permanently installed in the delivery fitting and cannot be replaced.
In order to avoid changing the complete electric fuel pump if the non-return valve has a leak, the parts set Part No. 1 587 010 003 with separate non-return valve has been introduced and can be used on the above-mentioned electric fuel pump.

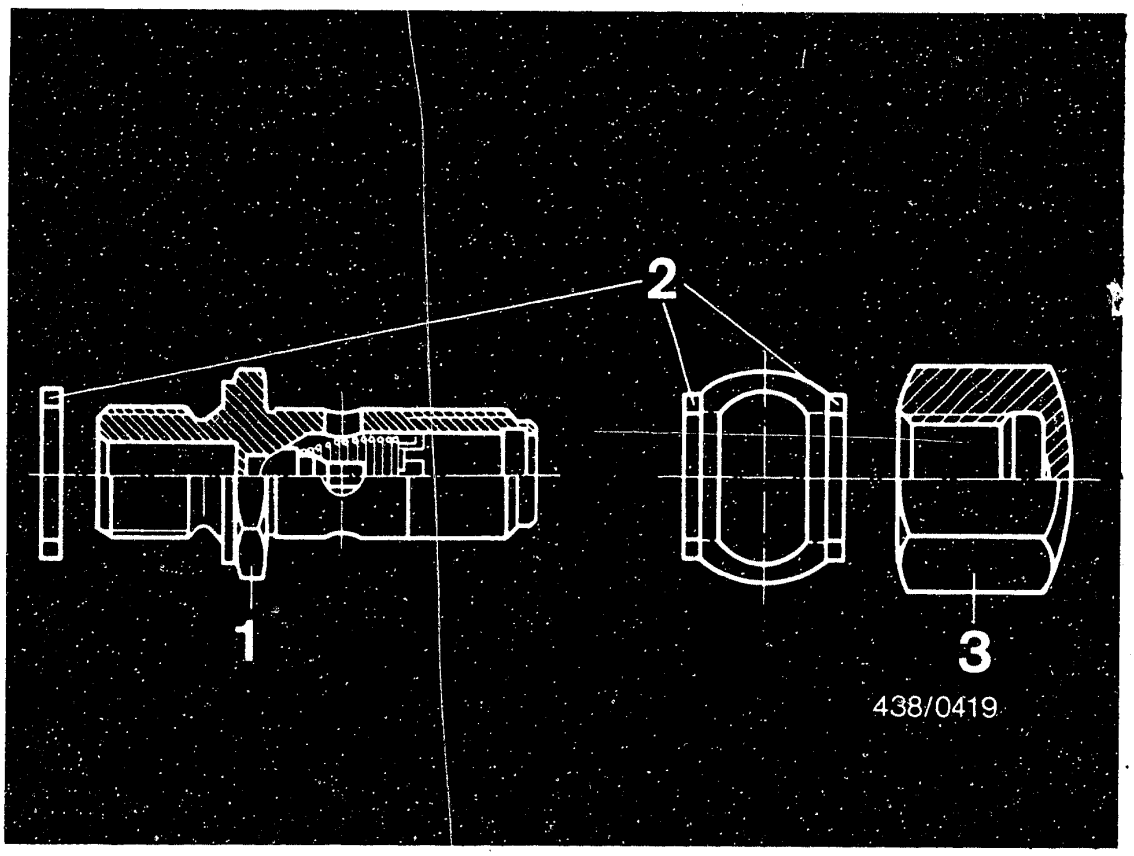


1 = Intake-noise damper
2 = Electric fuel pump
3 = Fuel filter
4 = Fuel accumulator

Installing the parts set:

Remove the dirt-deflector plate and thoroughly clean the connection of the delivery line on the electric fuel pump.
Pinch off the intake hose (between fuel tank and intake-noise damper), for example, using hose clamper W 157 from the Matra Co.

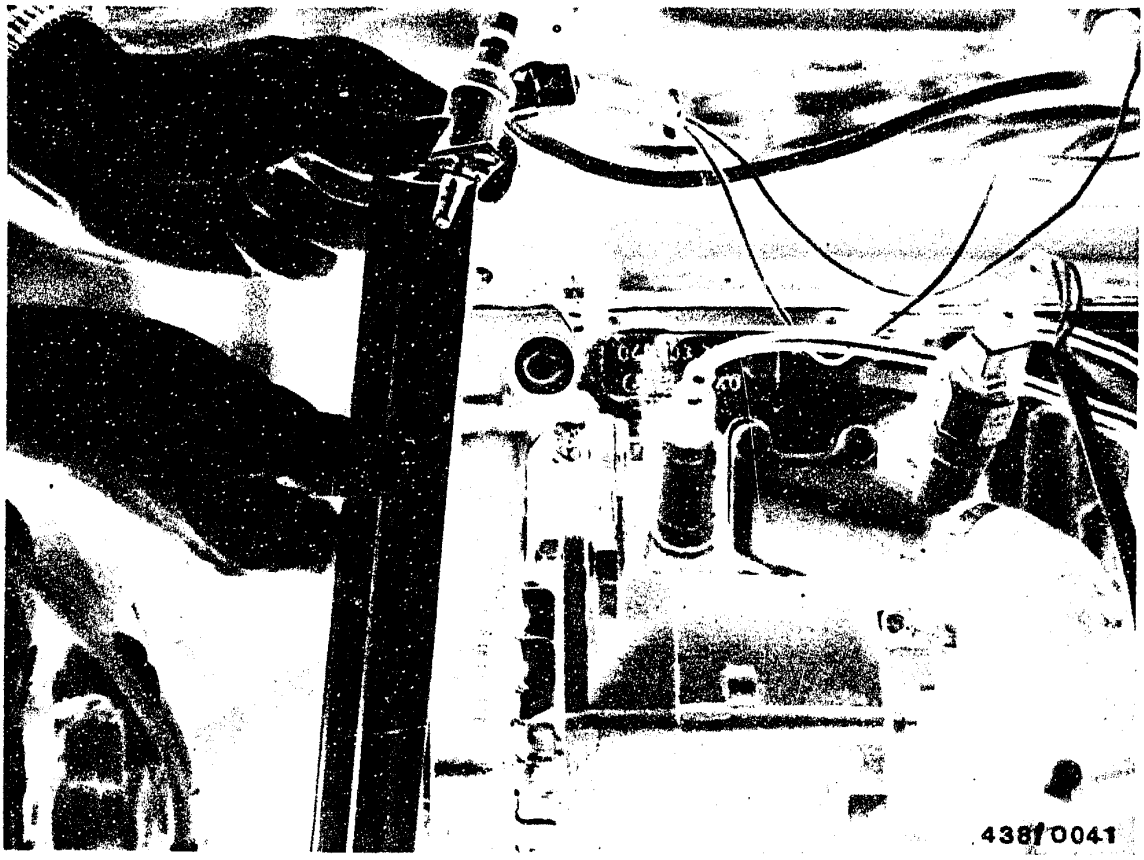
Screw off the delivery line, collecting any escaping fuel.



1 = Tube fitting
2 = Flat seal rings
3 = Cap nut

The original defective non-return valve remains in the electric fuel pump.
Screw the tube fitting of the parts set (short end) with a thick flat seal ring into the delivery fitting and tighten to a torque of 17...25 Nm.
Hold the hexagonal section on the delivery fitting with a wrench.
Fit a thin flat seal ring, the inlet union of the fuel line and another flat seal ring onto the long end of the tube fitting and tighten with the hexagon cap nut.
Remove the hose clamper from the intake hose.

Check the connections for leaks with the electric fuel pump operating.



- <u>The cold-start valve has a leak.</u>

Remove cold-start valve and connect hose line in place of the steel tubing.

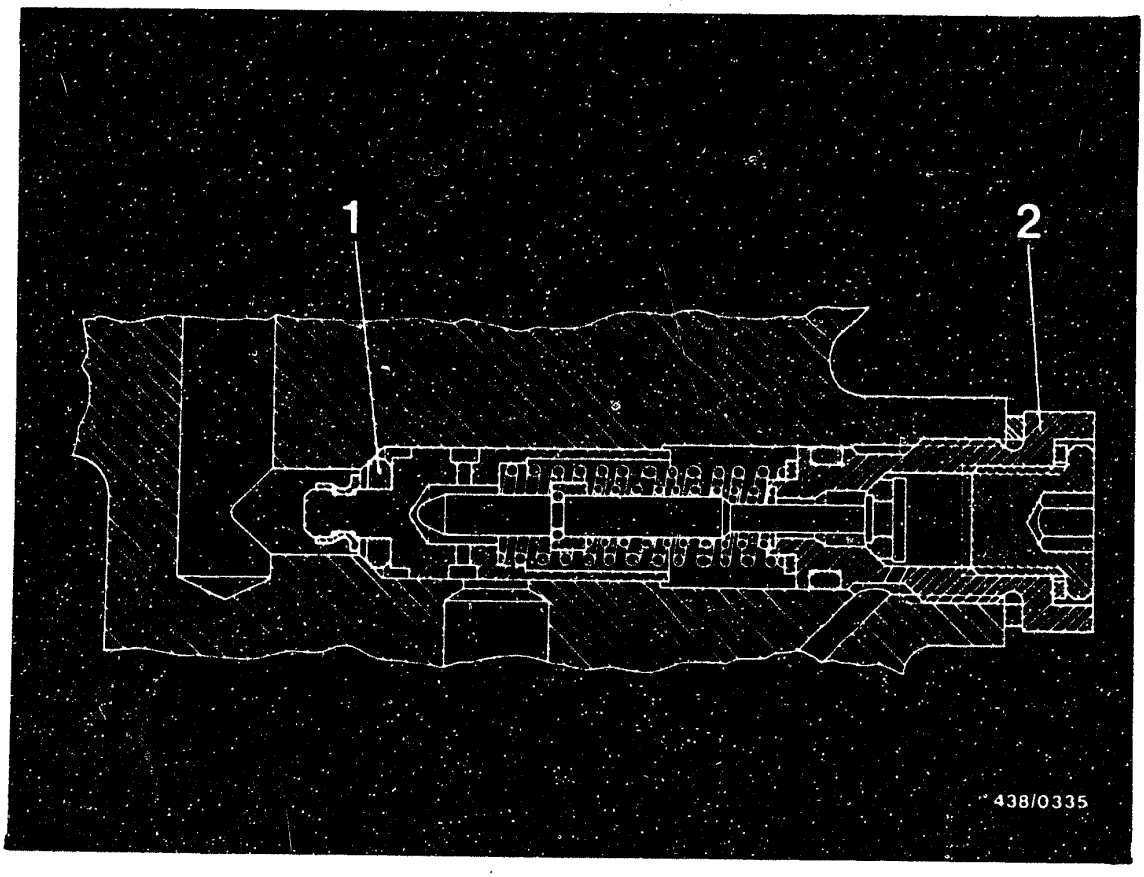
Hold start valve in a suitable container (e.g. graduate).

Switch on the electric fuel pump by bridging the electrical safety circuit.

Dry off the nozzle of the cold-start valve.
No drops must fall from the nozzle of the start valve within the next minute. Even when shaken and knocked, the start valve must not leak.

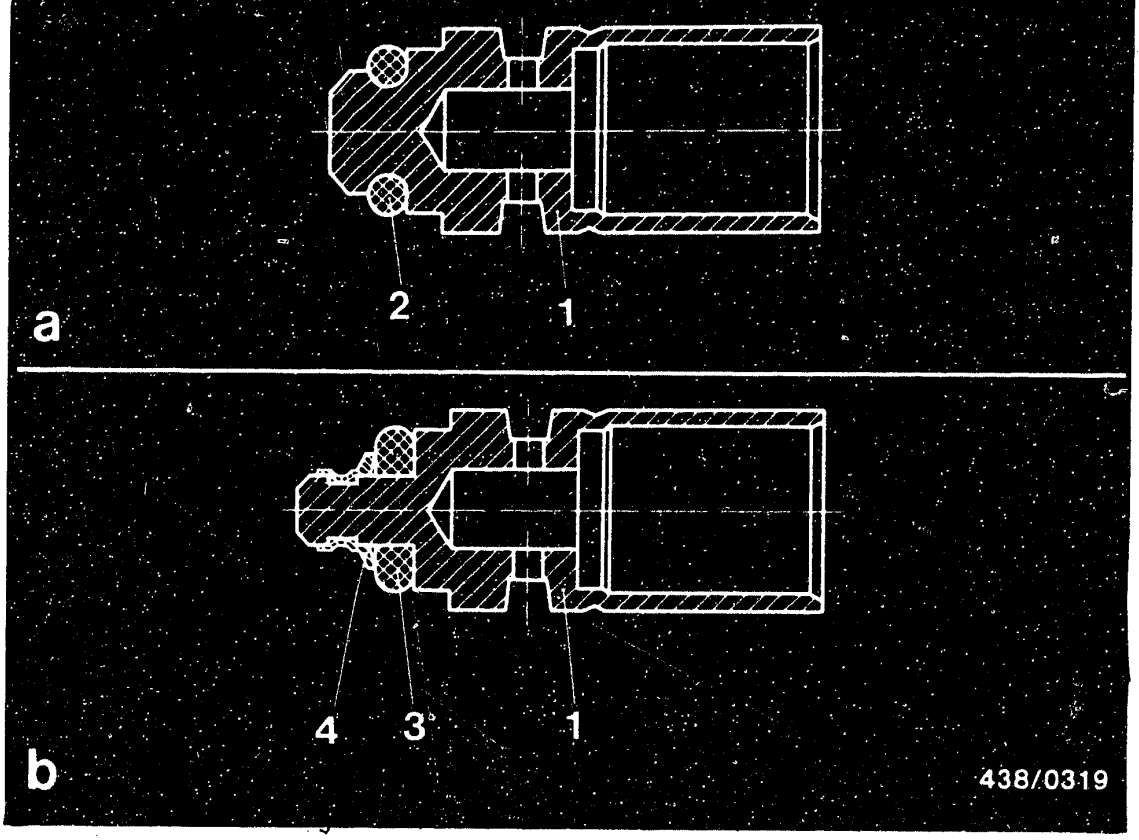
Switch the electric fuel pump off again.

Replace the cold-start valve, if leaky and then carry out the idle adjustment with the engine at normal operating temperature. See Coordinate F 13.



● Seal ring (1) on control piston of primary pressure regulator has a leak.

Replace seal ring:
Clean the fuel distributor in the region of the primary-pressure regulator. Screw out the large screw plug (2) with the complete push valve. Also remove shims, control spring and control piston.

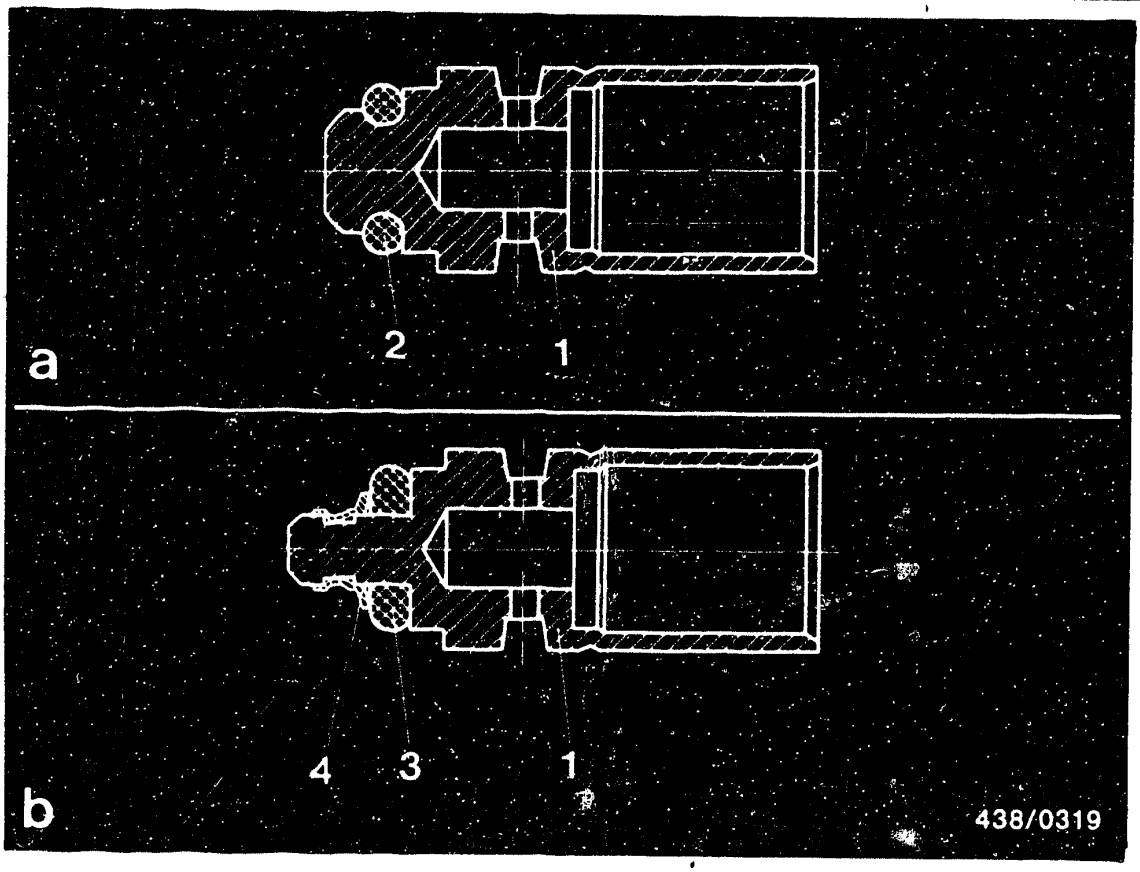


Control piston version with O-ring (Fig. a):

Change O-ring (Item 2).
Fit control piston (Item 1) and control spring.
Screw in screw plug with complete push valve and with shims (as when removed) and new seal rings.

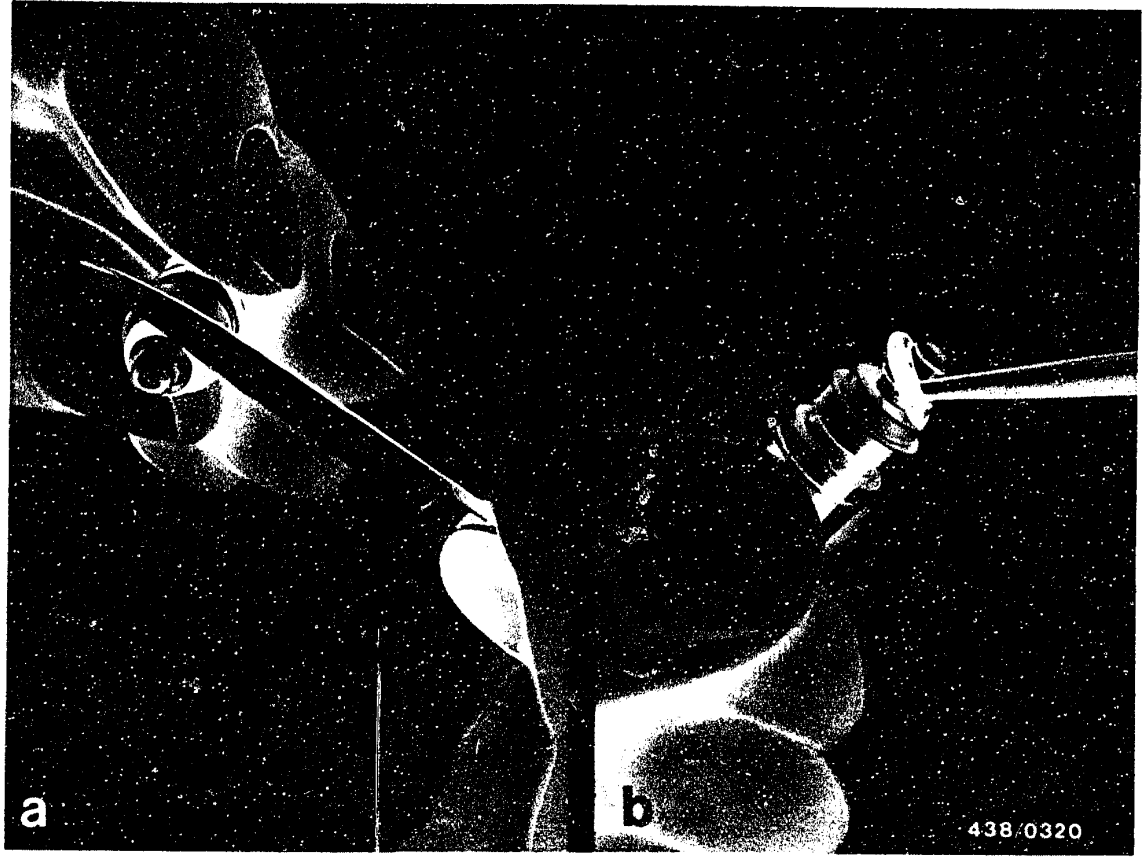
Finally, check the primary pressure and, if necessary, adjust:

Fuel distributor Part No.	Adjustment values - primary pressure
0 438 100 012 0 438 100 034 }	5.2...:5.4 bar (5.3...5.5 kgf/cm²) gauge pressure



Control piston version with shaped seal ring (Fig. b):

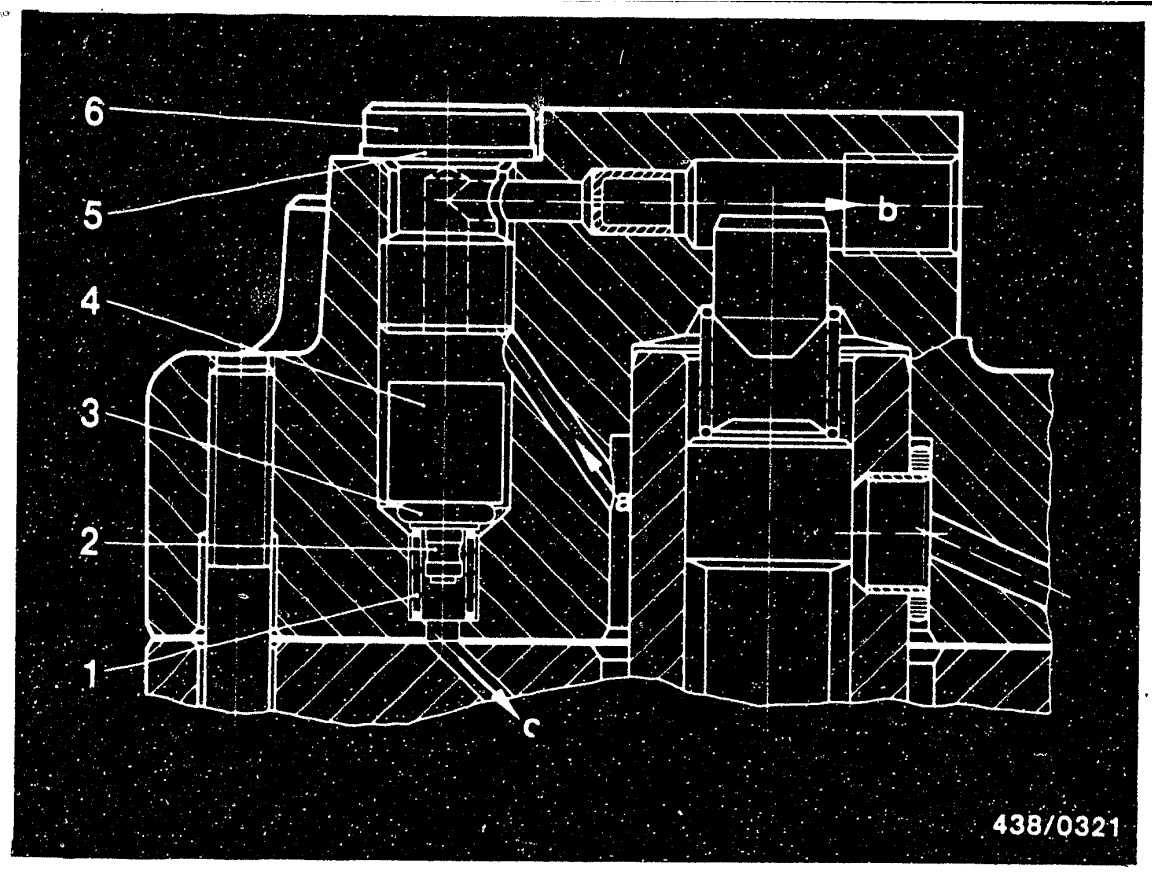
This version employs a specially shaped seal ring (Item 3) which is guided on a cylindrical peg and is held by a caulked retaining ring (Item 4).



The seal ring is changed without dismantling the retaining ring:
Cut and remove the old seal ring (Fig. a).
Pull the new seal ring over the retaining ring with a blunt marking tool (Fig. b). In doing so, do not overstretch the seal ring.
Then you must carefully check to see that the seal ring has been fitted without any damage. It must be possible to turn the retaining ring by hand. There must be a distance of approx. 0.2 mm between the retaining ring and the seal ring.

Finally, check the primary pressure and, if necessary, adjust:

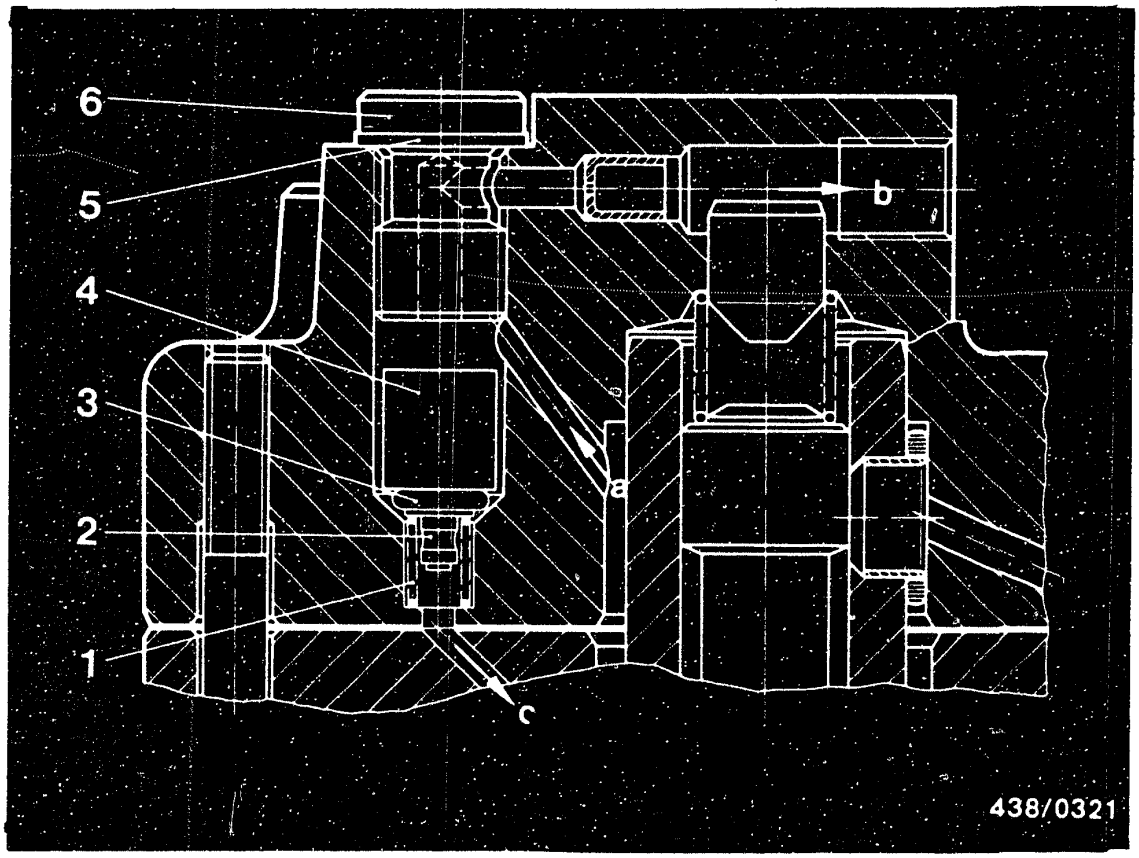
Fuel distributor Part No.	Adjustment values - primary pressure
0 438 100 012 0 438 100 034 }	5.2...5.4 bar (5.3...5.5 kgf/cm²) gauge pressure



a = Primary pressure
b = Control pressure (to warm-up regulator)
c = Fuel return
1 = Valve spring
2 = Retaining ring
3 = Shaped seal ring
4 = Valve piston
5 = Flat seal ring
6 = Screw plug

• Pressure-relief valve on control-pressure dome of fuel distributor has a leak.

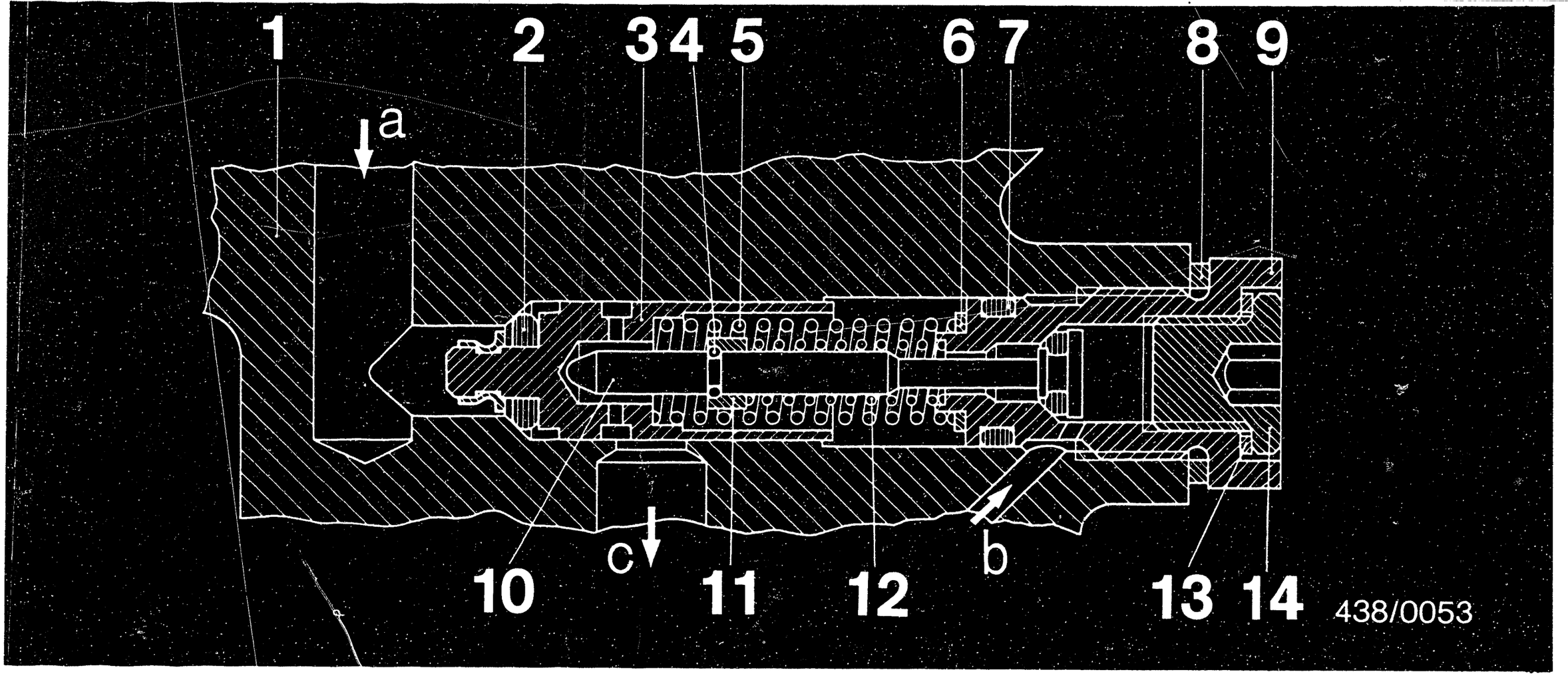
Replace the complete pressure-relief valve.
The parts set contains all items 1 to 6.



a = Primary pressure
b = Control pressure (to warm-up regulator)
c = Fuel return
1 = Valve spring
2 = Retaining ring
3 = Shaped seal ring
4 = Valve piston
5 = Flat seal ring
6 = Screw plug

Clean the fuel distributor in the area of the control-pressure dome. Screw out the screw plug using Torx offset wrench size TX 730 (commercially available). Remove the valve piston and valve spring.

Installing the parts set:
Insert the valve spring and partly-assembled valve piston of the parts set and close the bore with flat seal ring and screw plug.



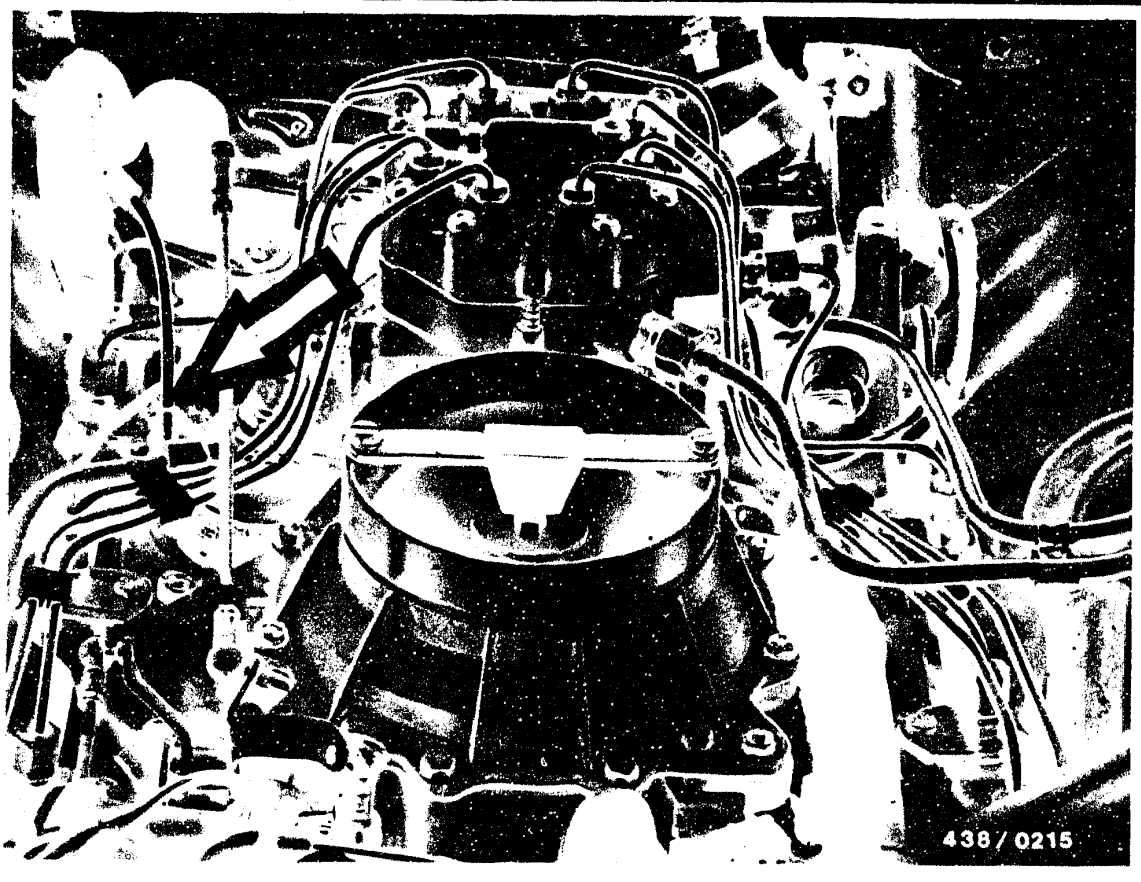
a = Primary pressure
b = From warm-up regulator
c = Fuel return

1 = Fuel-distributor housing
2 = Shaped seal ring
3 = Control piston
4 = Retainer
5 = Spring
6 = Shims
7 = O-ring
8 = Seal ring
9 = Screw plug
10 = Valve needle
11 = Retaining ring
12 = Spring
13 = Flat flange gasket
14 = Screw plug

16.5 Possible causes of a defect in the control-pressure circuit

- The push valve has a leak.

Replacing the push valve.
Since the seal ring of the push valve is rigidly vulcanized onto the valve needle, the screw plug (9) must be changed with the complete push valve (ready-assembled unit).
This also applies to earlier versions of the push valve with a loose O-ring on the valve needle.
The O-ring is no longer obtainable. When necessary, therefore always fit the complete valve unit.



16.6 Fuel-line-pressure damper

A leaky fuel-line-pressure damper can be detected by removing the hose from the leakage port (arrow).

17. Testing the injection valves

Remove the injection valves for testing.
When loosening the fuel lines, apply counter-force at the fixed hexagon of the injection valves.
Caution! Do not bend steel fuel lines!
When refitting the injection valves, it is best to replace the O-rings on the valve stem (Mercedes-Benz service part) in order to prevent leaks and thus the entry of unmetered air.

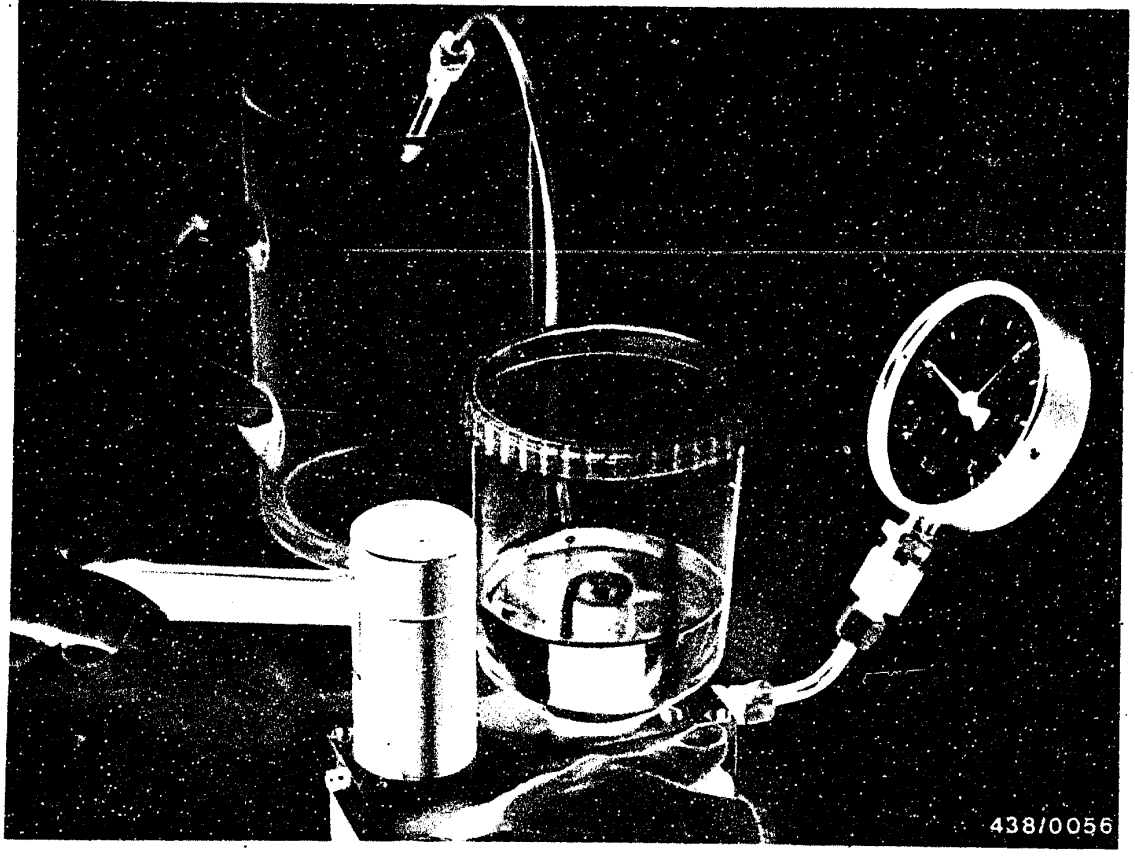
17.1 Test equipment and test media

The following testing specification refers to valve testers KDJE-P400 (previously KDEP 7452) and 0 681 200 700.

Observe the test-media specification!

Test media: Calibrating fluid (Shell K30, Esso-Varsol, Shell Mineral Spirits 135).
or
Bosch Part No. VS 14 942-CH
Former Part No. 5 973 340 650
The calibrating fluid can be obtained in 5 l metal cans from the following supplier:
Firma
Oskar Gnamm GmbH & Co
D-7531 Kämpfelbach-Bilfingen

Caution:
For safety reasons, never use normal gasoline or similar easily inflammable and combustible liquids.
Even with calibrating fluid, be sure to observe the local official regulations.

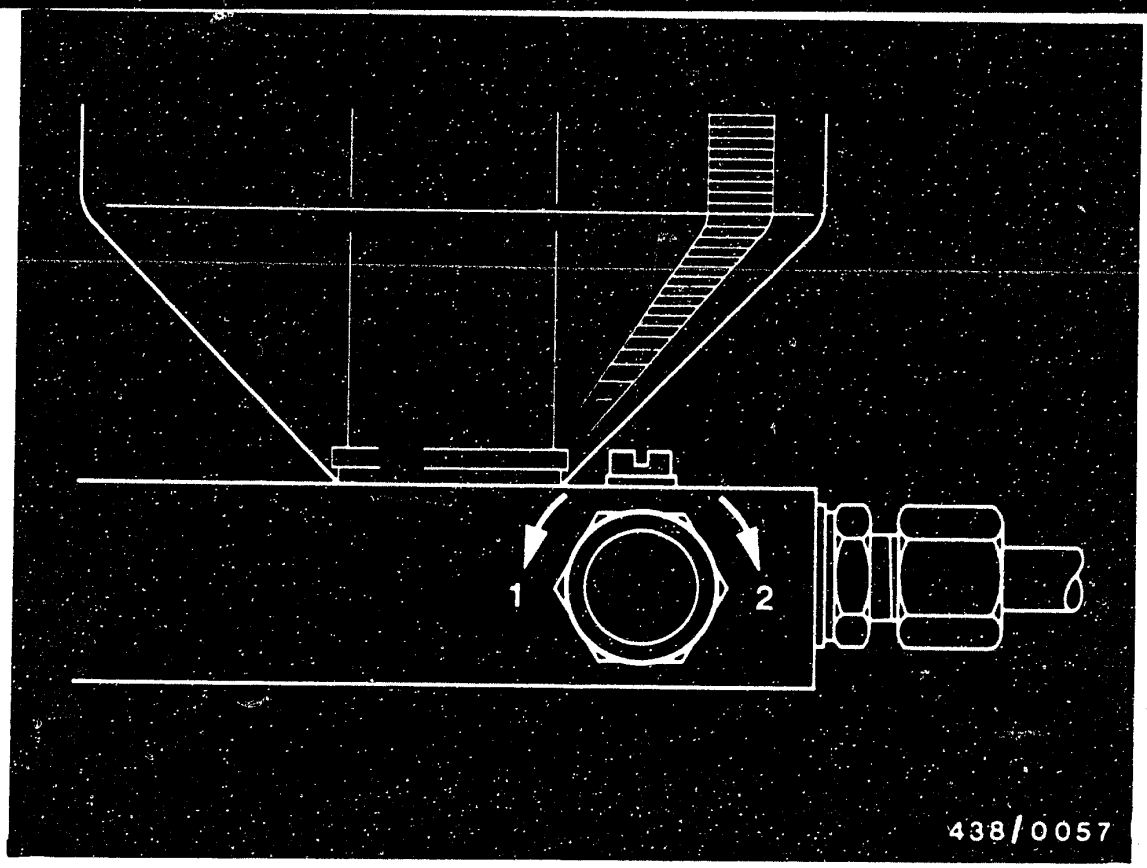


17.2 Connecting the injection valve to the tester

Connect injection valve to valve tester and bleed the discharge tubing by moving the lever back and forth several times with the union nut open. Then tighten the union nut.

17.3 Checking for dirt

Move the hand lever slowly (about 2 seconds per stroke) back and forth with the stopcock on the pressure gauge open. If the pressure does not build up to 1...1.5 bar gauge pressure, the injection valve has a bad leak (caused, for example, by dirt stuck in it).
You can try to flush the injection valve clear by moving the lever back and forth several times strongly. If this attempt is successful, continue the test. If it is not possible to flush the valve clear, replace it.

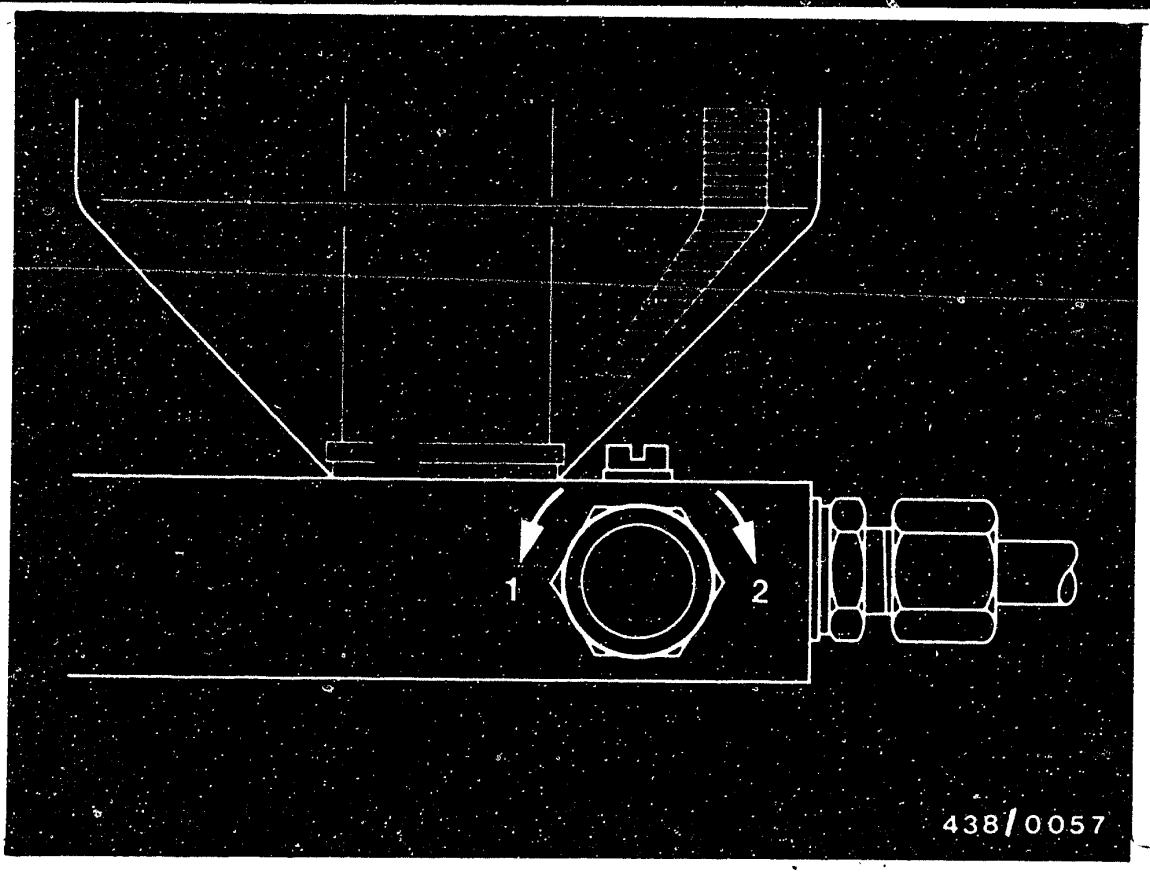


1 = Open
2 = Close

17.4 Testing the opening pressure

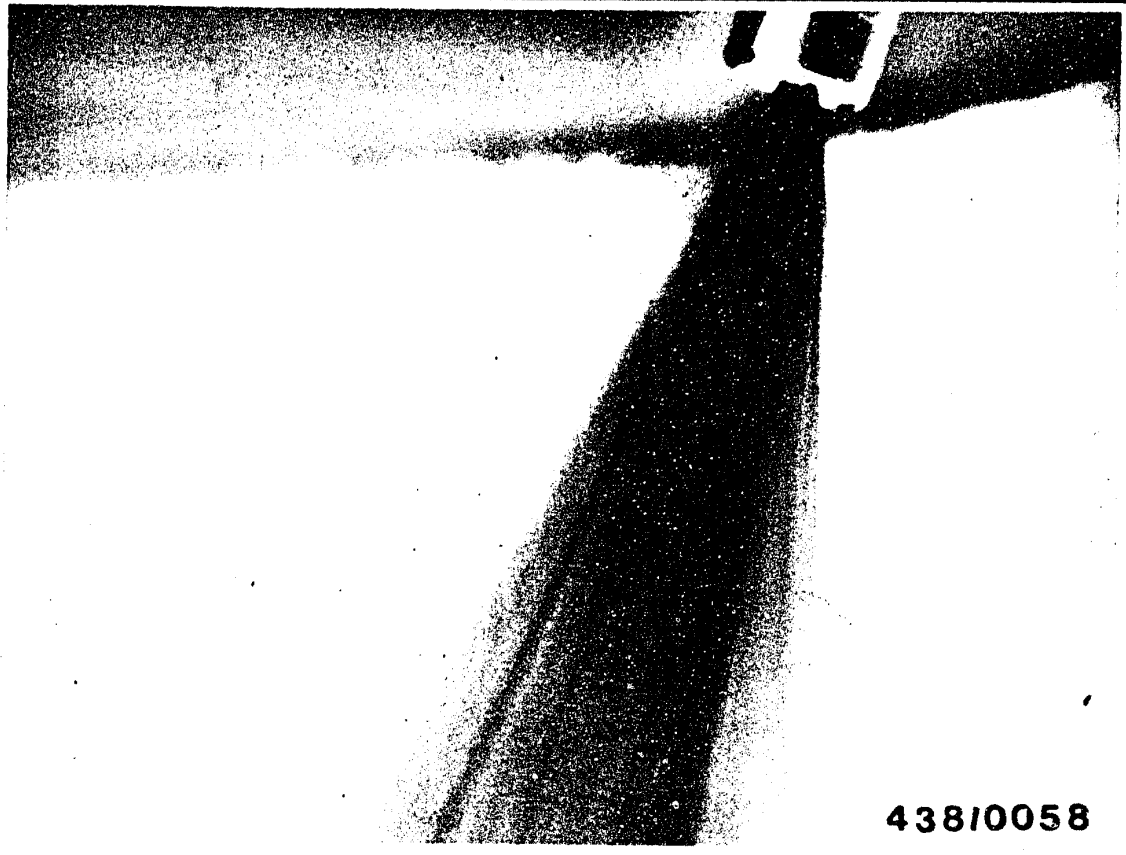
Injection valve Part No.	Test specifications - opening pressure
0 437 502 010	3.0...4.1 bar gauge pressure

With the stopcock closed, flush the valve out and bleed it with several rapid movements of the lever.
Open the stopcock and test the opening pressure by moving the lever slowly (about 2 seconds per stroke).
If the opening pressure is outside tolerance, replace the injection valve. Individual valves can also be interchanged within a set.



17.5 Leakage test

Open the stopcock, build the pressure up slowly to a value 0.5 bar under the opening pressure determined previously (but not less than 2.8 bar gauge pressure), and hold it constant at that level. No drops must now fall from the valve for the next 15 seconds.



43810058

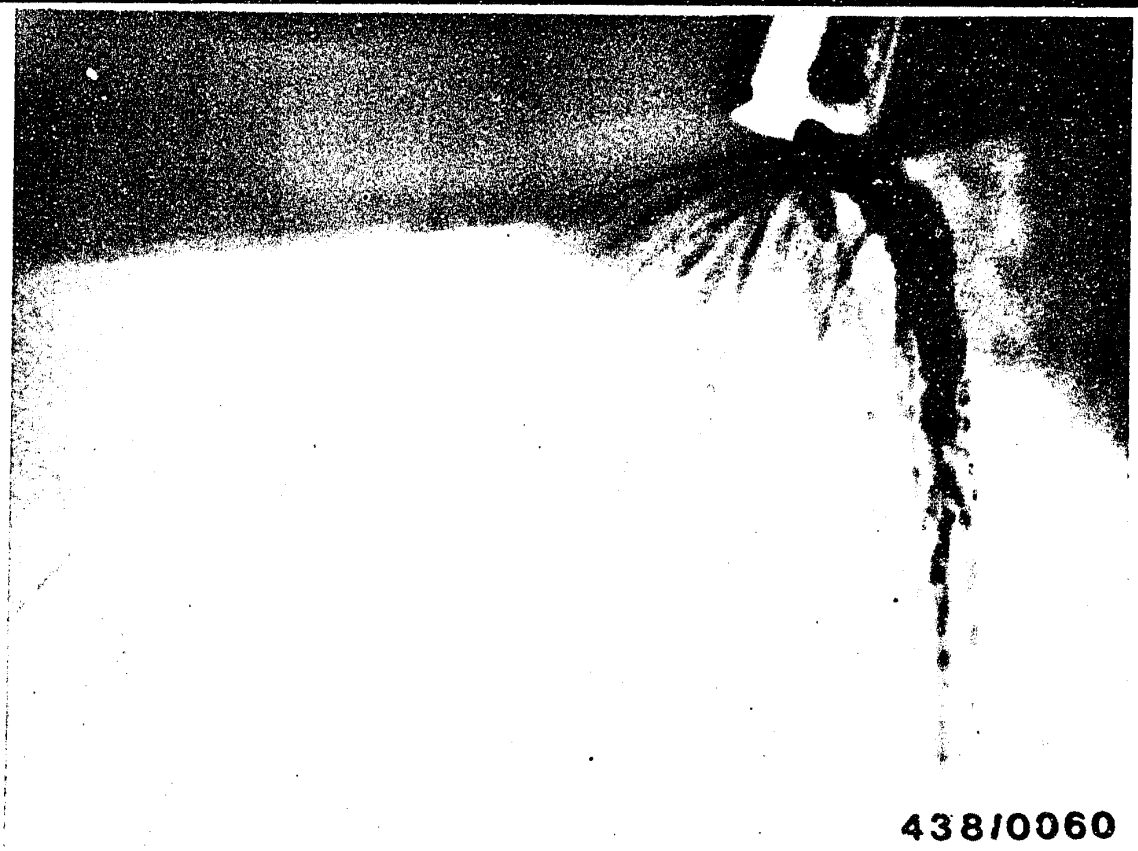
17.6 Chatter test, evaluation of spray

Move the lever back and forth at about 1 stroke per second. As this is done, the valve must chatter. No drops of fuel must form at the mouth of the valve. The valve must not produce a "cord spray". Formation of a single-sided, atomized spray within an overall spray angle of about 35° is permissible (see example given in illustrations).

Illustration shows good spray formation.

438/0059

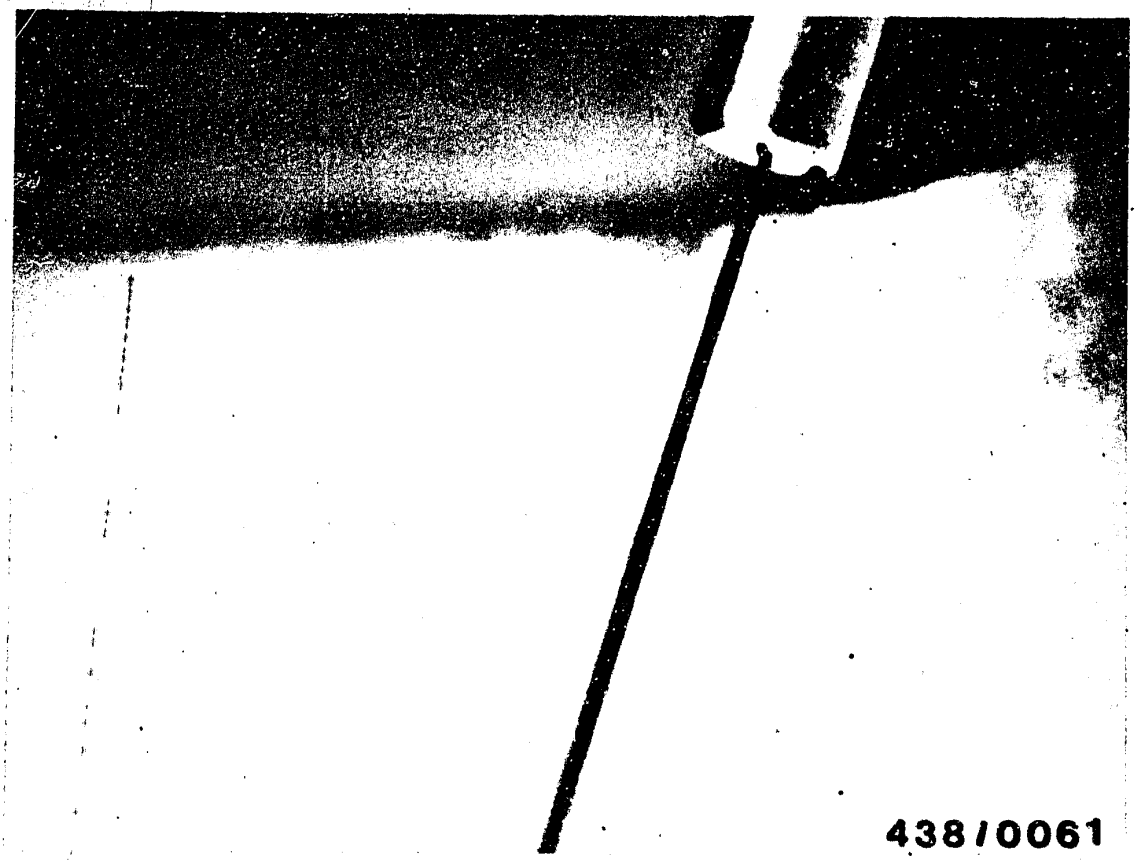
Illustration shows single-sided but nevertheless good spray formation.



438/0060

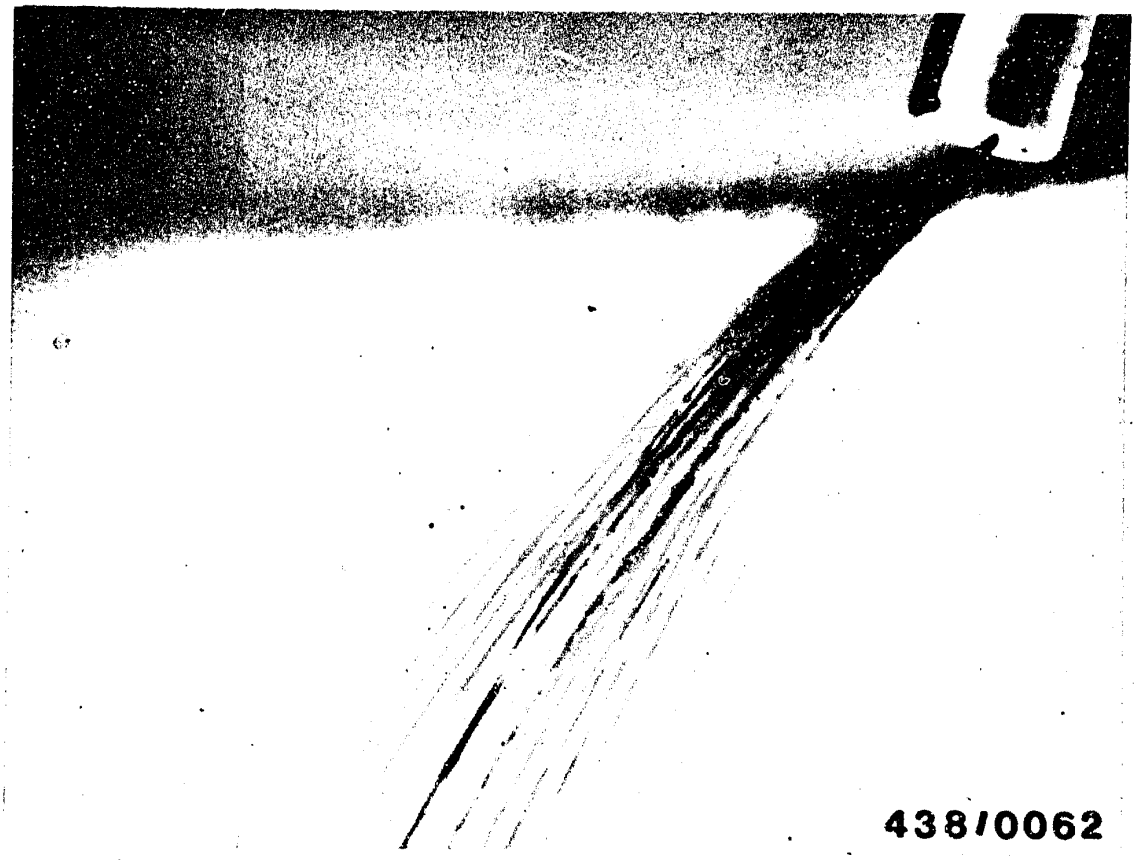
Poor spray formation; replace injection valves.

Illustration shows drop formation.



Poor spray formation; replace injection valves.

Illustration shows "cord" spray.



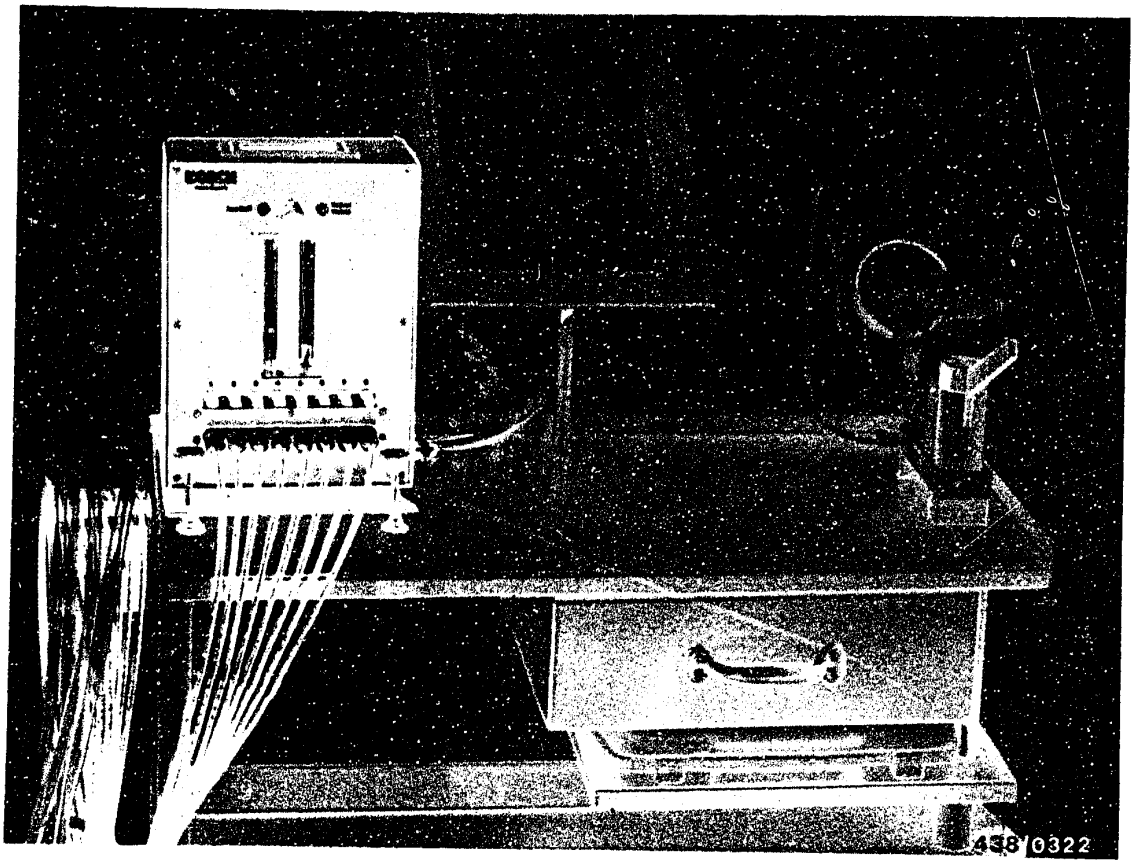
438/0062

Poor spray formation; replace injection valves.

Illustration shows "spray in strands".

If defective injection valves have been replaced, it is necessary finally to adjust the idle speed with the engine at normal operating temperature.

Idle-speed adjustment is described on Coordinate F13.



18. Comparative measurement of fuel delivery of fuel distributor outlets.

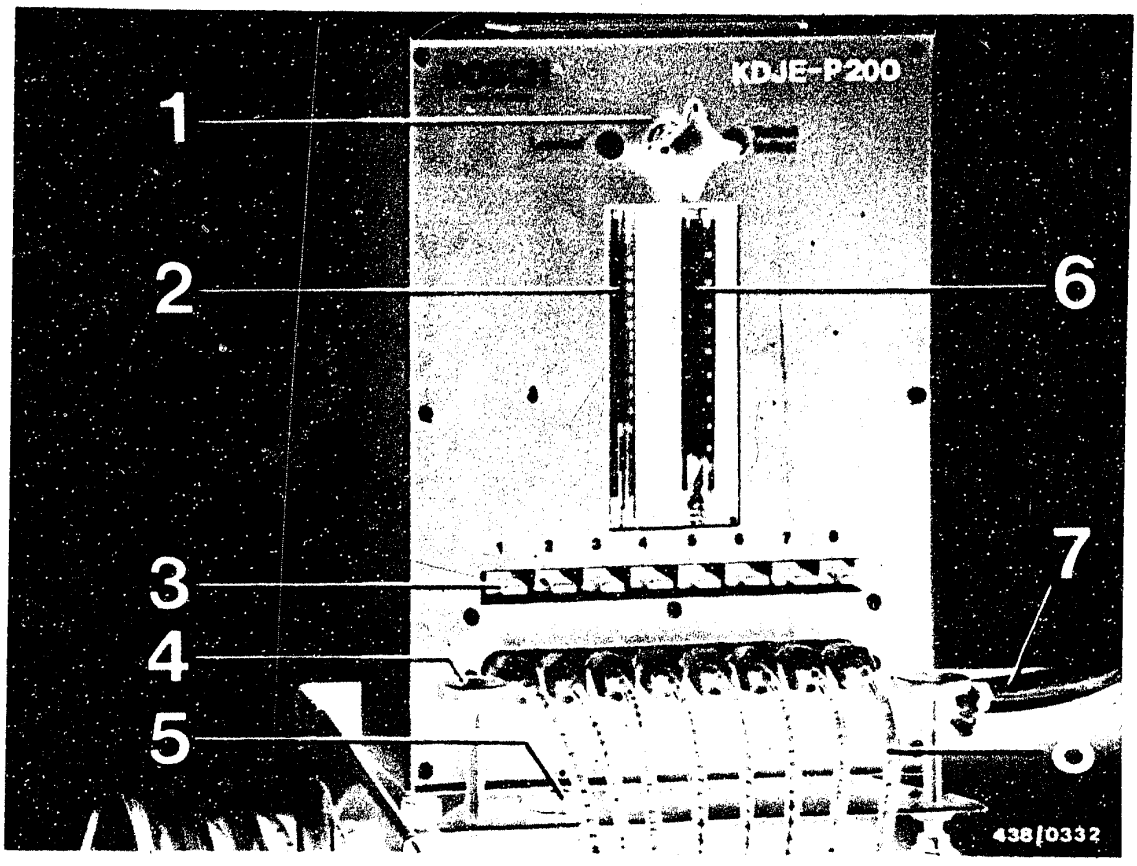
This test is carried out using the tester for delivered quantity comparison KDJE-P200 (previously KDJE 7451).

18.1 Application

By means of comparative measurements, the differences in the amounts of fuel delivered from the individual outlets on the fuel distributor are determined.

The tester is designed so that the test can be made on the vehicle without having to remove the fuel distributor.

Since the test is made with the original injection valves, the operator can recognize at the same time whether delivered-quantity scatter, if it occurs, is caused by the fuel distributor or by the injection valves.



1 = 3-way cock
2 = Small rotameter tube
3 = Keyboard
4 = Adjusting screw for setting up
5 = Spirit level
6 = Large rotameter tube
7 = Hose lines
8 = Return hose

18.2 Construction

The tester is designed for use with all engines, up to 8 cylinders, equipped with K-Jetronic.

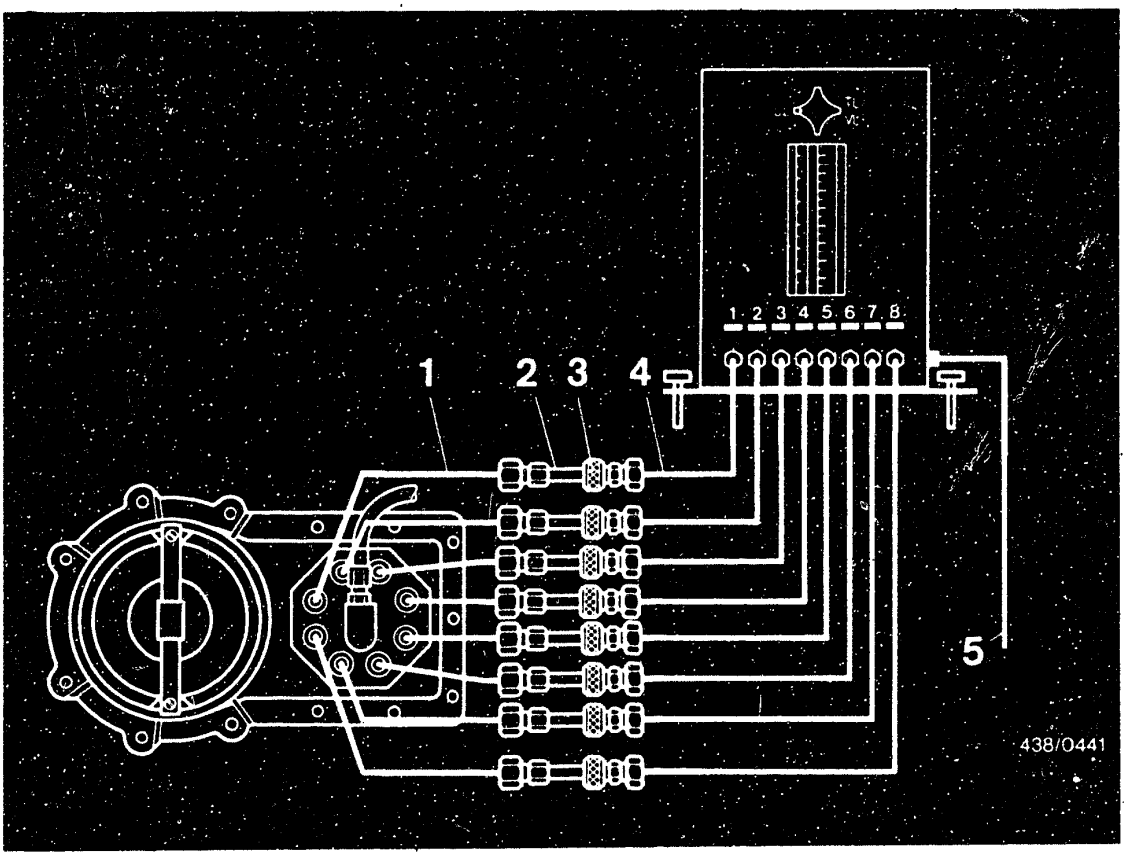
Basically, the tester consists of a steel housing containing 2 rotameter tubes with measuring ranges of 2...15 cm^3 and 10...180 cm^3, an 8-way valve for key operation (Item 3) and a 3-way stopcock (Item 1).

The small rotameter tube (Item 2) is used for the idle measurement while the large tube (Item 6) is used to measure the fuel delivery at part- and full-load. The particular rotameter tube to be used is connected by means of the 3-way stopcock. Using the 8-way valve, the fuel delivery of each cylinder is tested one after the other.

Attached to the tester are 8 hoses (Item 8), each terminated with an automatic connector. When the injection valves are withdrawn from their sockets on the engine they are attached to these connectors. Each automatic connector is fitted with a push valve so that no fuel can escape from connectors that are not in use (when 4- or 6-cylinder systems are tested).

The fuel is returned to the fuel tank through a hose (Item 7) about 5 m long.

The entire test is made with a closed circuit, i.e. no fuel escapes.



1 = Adapter connection hoses from line set KDJE-P200/25
2 = Injection valves
3 = Automatic connectors
4 = Tester hoses
5 = Return line to fuel tank filler neck

18.3 Setting up and connecting the tester:

Set the tester up beside the engine on a solid base (e.g. on tester trolley KDJE-W 100) and align it with the built-in spirit level at the base of the tester.

So that the rigid fuel-injection tubing is not bent too much, the tester for delivered quantity comparison is connected using the adapter connection hoses KDJE-P200/25.

Remove the injection valves completely.

Unscrew the fuel-injection tubing from the fuel distributor and connect the adapter connection hoses instead.

Screw the injection valves onto the adapter connection hoses.

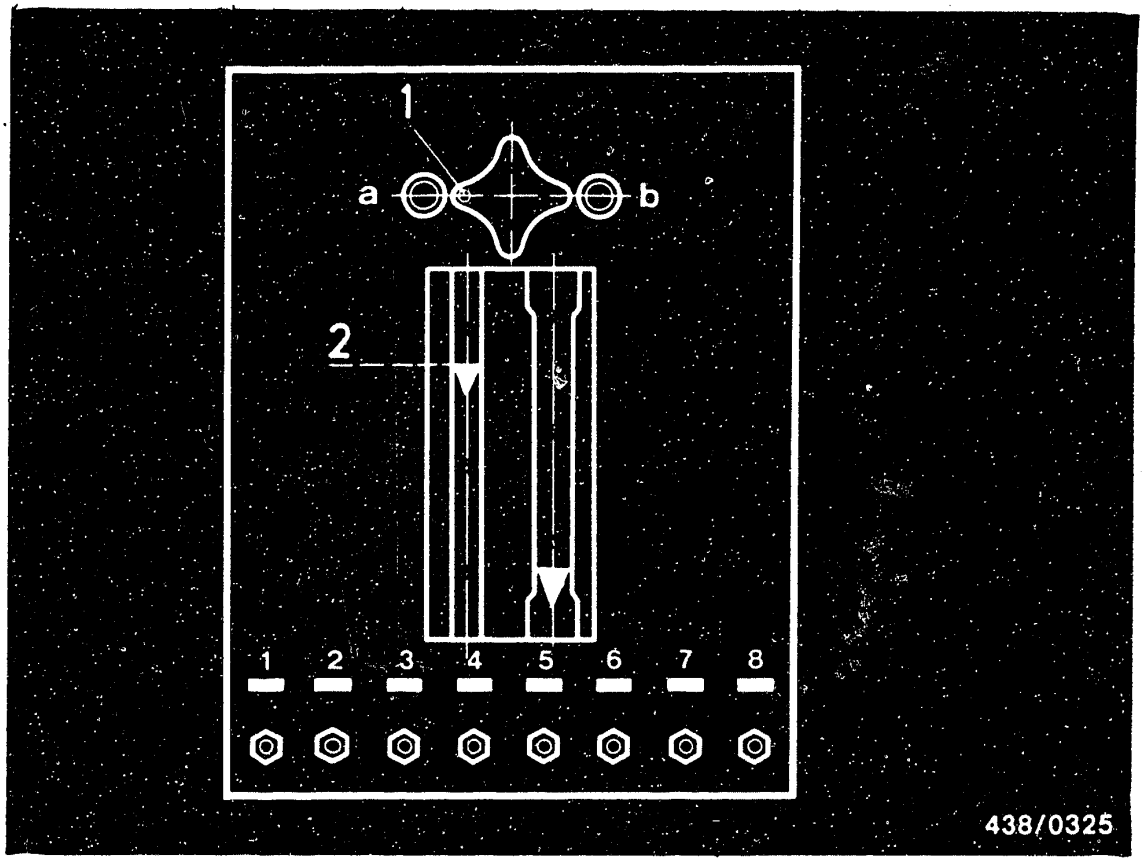
Clean the injection valves with a rag and insert injection valves into the automatic connectors of the first four tester hoses.

Note:
Insert the injection valves as far as they will go and tighten the knurled thumbscrews well so that the non-return valves of the automatic connectors are opened fully.

Introduce the return hose of the tester into the fuel tank filler neck.

18.4 Bleeding the tester:

Remove the air filter so that the air-flow sensor plate becomes accessible.
Remove the electric plugs from the warm-up regulator and the auxiliary-air device.
Switch on the electric fuel pump by bridging the electrical safety circuit.
Press down the air-flow sensor plate to the stop.
Press the keys on the 8-way valve one after the other, while simultaneously switching the 3-way stopcock until both rotameter tubes are bled.
Return the sensor plate to the rest position.



1 = White dot
2 = Measuring line

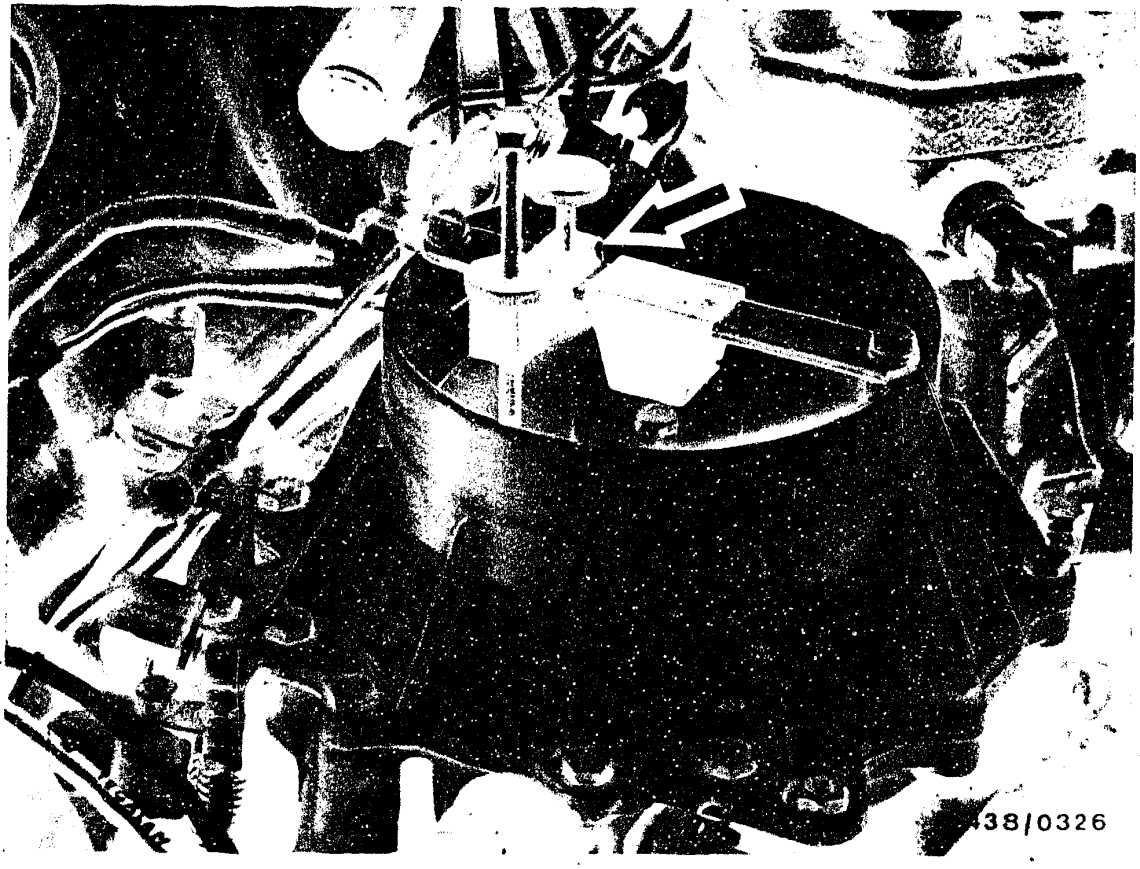
a = Idle
b = Part load/full load

18.5 Testing:

The flow comparison measurement is made in the idle, part-load and full-load ranges.

The small rotameter tube is to be used for the idle measurement (white dot to left on control knob); part-load and full-load measurements are made using the large rotameter tube (white dot to right).

The delivered quantities indicated on the rotameter tubes are read off at the top edge of the conical float (Item 2):
On testers with a ball float the uppermost point of the ball is used for reading off. With each measurement be sure to wait until the float has reached its final position. This may take 20...30 seconds in the case of small deliveries.



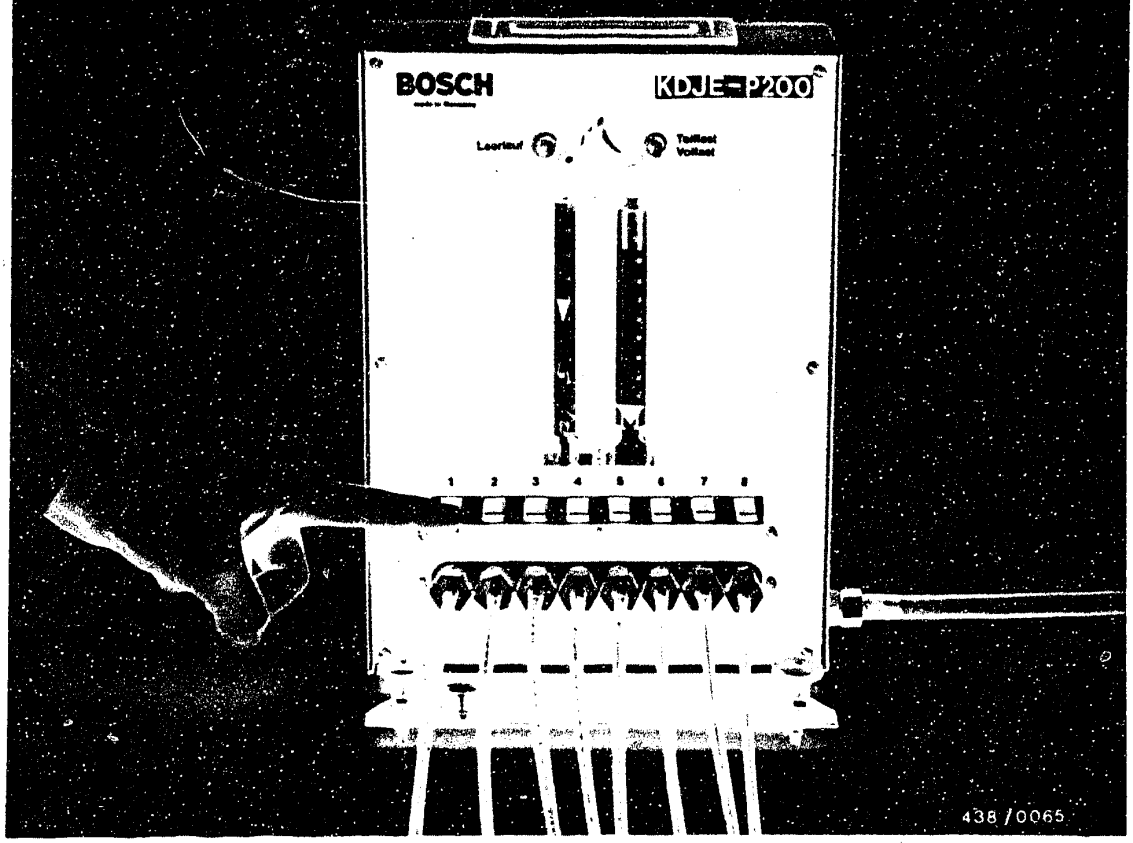
The exact setting and locating of the position of the air-flow sensor plate for the various load ranges is done using the setting device KDJE-7456.

With the adjusting screw initially screwed all the way out, the setting device is clamped onto the stop bracket of the air funnel (arrow).
Adjust the position of the air-flow sensor plate using the adjusting screw.

Procedure:

Switch on the electric fuel pump by bridging the electrical safety circuit.
Fixed numerical values are specified in the following test section for the maximum permissible fuel delivery differences for the individual load ranges.

The "set point" value always pertains to the fuel-distributor outlet with the lowest fuel delivery, i.e. in each case the outlet with the lowest delivery is to be first ascertained.



Press the key for outlet 1. Pivot the air-flow sensor plate until the corresponding rotameter tube approximately indicates the "set point" value. Fix the air-flow sensor plate in this position.

Test the remaining outlets in order to determine which outlet has the lowest fuel delivery.

Press the key for this outlet again, and set the delivery precisely to the "set point" by correcting the position of the air-flow sensor plate. Then fix the air-flow sensor plate in this position again.

Press the remaining keys one after the other, and determine the maximum fuel delivery of each outlet. A deviation in fuel delivery can only be above the "set point".

18.6 Test specifications

	Set point cm^3/min	Max. permissible fuel delivery cm^3/min
Idle	6.0	6.6
Part load	30.0	34.0
Full load	100.0	110.0

18.7 Final operations

Re-fit the injection valves properly.
Also fit the air filter. Make sure that all lines are laid correctly.
Re-connect the electrical safety circuit of the K-Jetronic properly.

If, in the case of repeat measurements in one of the 3 load ranges, a wider scatter is found than allowed by the test specifications, the fuel distributor must be replaced.

It is necessary finally to adjust the idle speed with the engine at normal operating temperature.

Idle-speed adjustment is described on Coordinate F 13.

19. Idle-speed adjustment

19.1 Preparations for idle-speed and CO adjustment

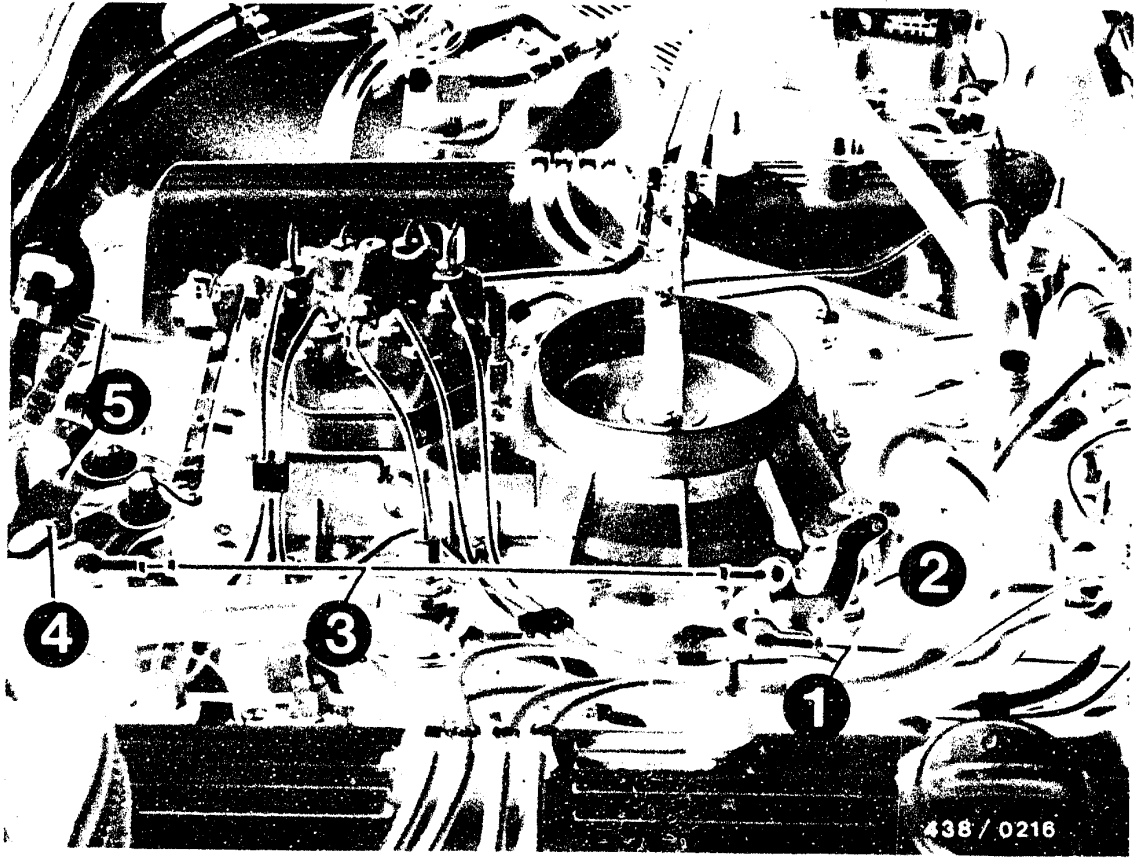
Warm up the engine for adjusting the idle speed (oil temperature approx. 80°C).

Important note:

If the fuel-injection tubing or injection valves were loosened or removed, the engine should be warmed up under load. The low rate of fuel flow during idling is not always adequate to drive all the air out of the fuel-injection tubing.

The idle speed must not be adjusted when the engine is too hot, e.g. immediately after being raced or after a power measurement on the roller-type test stand.

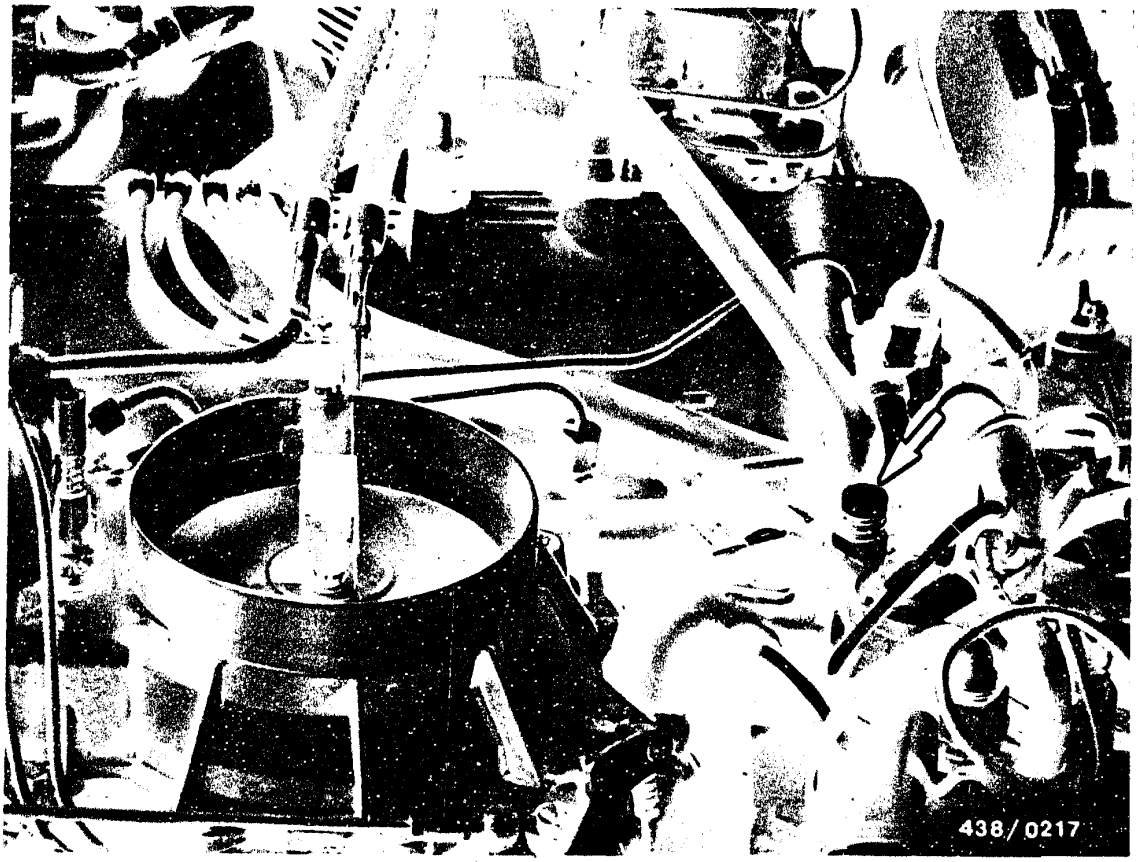
In vehicles with an air conditioner, this should be switched off in order to stabilize the engine speed.



In vehicles with an electric cruise control check whether the final controlling element is up against the idle stop.
If necessary, adjust the tie rod (1) so that, when it is hooked in, it forces the lever of the final controlling element about 1 mm away from the idle stop.

Unhook the connecting rod (2) from the throttle-valve assembly and check whether the throttle valve is up against the idle stop.

Hook the connecting rod back in so that it is free of tension. To do this, adjust the cross-rod (3) so that the roller (4) in the variable-fulcrum lever (5) is up against the end stop free of tension.



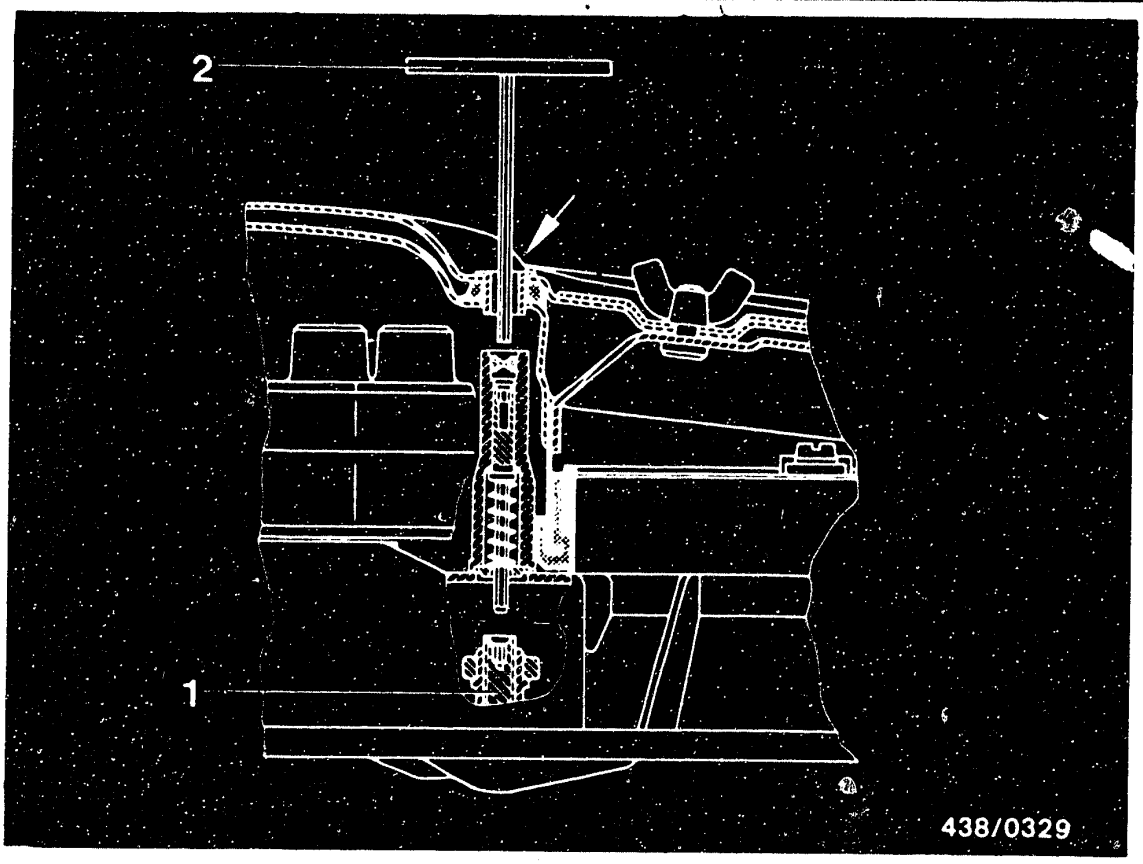
19.2 Adjusting the idle speed and CO concentration

The idle speed is adjusted at the bypass screw (1).
The CO concentration is adjusted at the idle-mixture-adjusting screw (2) in the mixture-control unit.

Test specifications - Idle-speed adjustment:

Idle speed		
350/380 (116 engine):		700...750 min^{-1}
450/500 (117 engine):		650...700 min^{-1}
CO concentration	:	0.5...1.5 % by vol.

Select drive mode "D" with the selector lever (automatic transmission), switch on the air conditioner, turn the power-assisted steering to full lock.
The engine must continue running. If necessary, re-adjust the idle speed.



Adjusting the CO concentration

Adjust the CO concentration in the exhaust gas at the idle-mixture-adjusting screw (1) in the mixture-control unit.
The CO concentration is adjusted with the air filter fitted. The adjusting wrench KDEP 1035 (2) is inserted through the specially provided opening in the air filter (arrow).
The idle-mixture-adjusting screw is adjusted via a setting device rigidly fitted on the mixture-control unit with a spring-loaded hexagon-socket key.
To make the adjustment, carefully press down the hexagon-socket key of the setting device using the adjusting wrench until it locks in position in the idle-mixture-adjusting screw. Remove adjusting wrench after each adjustment. The hexagon-socket key is forced upwards by the built-in spring and automatically seals off the hole leading to the idle-mixture-adjusting screw by means of an O-ring seal.

Turning to the right = Richer mixture
Turning to the left = Leaner mixture

Caution:
Always make the adjustment from the lean side, i.e. if the mixture is too rich turn the idle-mixture-adjusting screw further to the left than necessary, and then turn it to the right up to the setting required.
After every adjustment remove the adjusting wrench immediately and accelerate the engine briefly. Do not accelerate the engine with the wrench still in place because this could result in bending the control lever in the air-flow sensor.

Anti-tamper device for idle-mixture-adjusting screw:
In the Federal Republic of Germany, in accordance with an order for amending the Road Traffic Registration Code, § 47, Exhaust Gases and Their Discharge, has been amended. This order was printed in full in the Verkehrsblatt 13 of 15 July 1975.

Accordingly, all motor vehicles with externally supplied ignition produced as of 1 October 1976 must be provided with anti-tamper devices for the idle-mixture-adjusting screw so that it is not possible to adjust the screw without destroying the anti-tamper device. The intention is to prevent non-experts from re-adjusting the idle setting and thus inadmissibly influencing the exhaust gas. Consequently, the anti-tamper caps may only be used in the workshop and must not be sold to customers for their own use.

These anti-tamper caps come in different colours. Use the following cap and colour for the after-sales service:
In the downdraft air-flow sensor:
Blue anti-tamper cap (not obtainable from Bosch).
Part No. of Daimler Benz 000.997.5986.
Of Deutsche Vergaser Gesellschaft: K 34 520

The bore of the setting device (for receiving the adjusting wrench) is sealed by a plug.
The anti-tamper device is removed and fitted using special tools (e.g. tool set No. 4521/7 from Hazet Co., 5630 Remscheid).

After-sales Service

Technical Bulletin

Packaging of goods under warranty

438

K-Jetronic (CIS)

VDT-I-438/101 B
10. 1976

All components or assemblies of the K-Jetronic which are dispatched under warranty must be correctly and carefully packaged so that no further damage or impairments occur during transit, since these would not be covered by warranty.

Any fuel remnants must be removed from those K-Jetronic assemblies intended for dispatch, so as to eliminate any danger of fire during transit.

The intake openings and outlets of the assemblies must be sealed off with caps or plugs. As new products were fitted, the caps or plugs from these may be used.

The plunger of the fuel distributor is to be fitted with a protective cap of adequate size, or secured to the fuel distributor.

In addition, the assemblies are packed in tightly packed, well-sealed plastic sleeves. Fuel distributors and warm-up regulators are packed individually.

If components arrive damaged due to incorrect packaging or do not comply with these instructions, they can be returned and the warranty claim rejected.

BOSCH Geschäftsbereich KH Kundendienst Kfz-Ausrüstung

After-sales Service

Technical Bulletin

Securing of idle-speed adjusting screws

K-Jetronic (CIS)

438

VDT-I-438/102 B
11.1976

According to a statutory regulation, changes have been made to § 47 of the German traffic licensing laws concerning exhaust gases and their outlets. This regulation was printed in full in traffic law sheet 13 of 15.7.75 .

Consequently, all motor vehicles with external-ignition engines must have their idle-speed adjusting devices secured from the 1st October 1976, so that adjustment of the screw is impossible without destroying the securing device. This should stop unskilled people from adjusting the installation of the idle-speed system and thereby illegally influencing the emission values. As from now, securing caps can only be used in the workshop and cannot be sold to customers for their own use.

Securing caps are produced in various colors. For after-sales service the following caps and colors are used:

downdraft air-flow sensor
Blue — securing cap is not available from BOSCH. Part number is DB 000.997.59 86 from the Deutsche Vergaser Gesellschaft K 34 520

updraft air-flow sensor
Red — Part number 3 430 522 002

These stipulations are only valid in countries where ECE regulations (Economic Commission for Europe) apply. The air-flow sensors must however be converted for the use of these securing caps, as a matter of principle. The caps can also be used in countries not subject to ECE regulations, to prevent dirt penetrating through the pipe to the adjustment in the case of updraft air-flow sensors.

BOSCH Geschäftsbereich KH Kundendienst Kfz-Ausrüstung.

After-sales Service

Technical Bulletin

SUPPLY PUMPS 0 580 ..

Overview of the non-return valves

Replaceable non-return valves

Part Number	Appropriate seal ring	Fitted in supply pumps
1 583 385 004	1 580 203 002	0 580 254 990, ..991,..998
.. 006	.. 002	.. 985
1 583 386 008	.. 001	.. 987, ..988,..989
.. 011	.. 001	.. 986, ..996
.. 014	.. 001	.. 992
.. 016	1 580 105 001	.. 970, ..971,..972,
		.. 973, ..974,..980

Parts sets (comprising non-return valve complete with seal ring)

1 587 010 001	-	0 580 254 992
1 587 410 901	-	.. 978, ..982 FD823→

Supply pumps fitted with non-replaceable non-return valves

0 580 254 975, ..976, ..977, ..979 and ..982 → FD 822

BOSCH Geschäftsbereich KH Kundendienst, Kfz-Ausrüstung

After-sales Service

Technical Bulletin

FIRMLY FITTED NON-RETURN VALVE

Repairs
fuel pumps 0 580 254 ...

VDT-I-438/107 En
5.1980

Previously fuel pumps with non-exchangeable non-return valve (see VDT-I-438/104 En) had to be exchanged completely in cases of leakage in the non-return valve.

If the fuel pump is in working order and only the non-return valve leaks, there is now the possibility of repairs as part of after-sales service. 2 parts sets have been produced for this purpose, they contain, amongst other things, a tube fitting with built-in non-return valve.

Before using the parts set the installation conditions should be checked. The defective non-return valve can remain in the fuel pump which does not have to be dismantled for fitting the parts set. Before disconnecting the fuel lines the pressure fittings of the fuel pump and the fuel lines should be thoroughly cleaned.

Description and fitting

Parts set 1 587 010 003 for fuel connection with inlet union.

Screw the tube fitting (short side) with the thick flat seal ring into the pressure fitting and tighten. In doing so press against the hexagon of the pressure fitting with a wrench. Place the thin flat seal ring, the fuel-line inlet union and the other flat seal ring on to the long side of the tube fitting and tighten with the hexagon cap nut. Run the engine and check that there are no leaks in the connection.

Parts set 1 587 010 004 for fuel connection with nipple and union nut.

Screw the tube fitting with flat seal ring into the pressure fitting and tighten. In doing so press against the hexagon of the pressure fitting with a wrench. Screw the fuel line to the tube fitting with a union nut and tighten. Run the engine and check that there are no leaks in the connection.

BOSCH
Geschäftsbereich KH Kundendienst, Kfz-Ausrüstung

After-sales Service

Technical Bulletin

HOT-STARTING PROBLEMS

438

VDT-I-438/105 En
3.1980
Replaces Ed. 2.1980

K-Jetronic

Hot-starting problems can occur in various vehicles fitted with K-Jetronic. This means that when an engine is switched off whilst still hot and then switched on again after a short period, it does not start as well as it should.

The engine, the ignition system and the K-Jetronic system in these vehicles should be carefully checked. With the K-Jetronic particular attention should be paid to the:

complete system (in case of leaks),
injection valves (in case of leaks),
correct position of the air-flow sensor plate (rest position).

Instructions can be found in the vehicle-related repair manuals VDT-W-438/5.. .

If the engine still does not start satisfactorily when hot, even after checking, a timing relay can be fitted in K-Jetronic systems which are not equipped with a solenoid valve for reducing the control pressure as additional starting help.

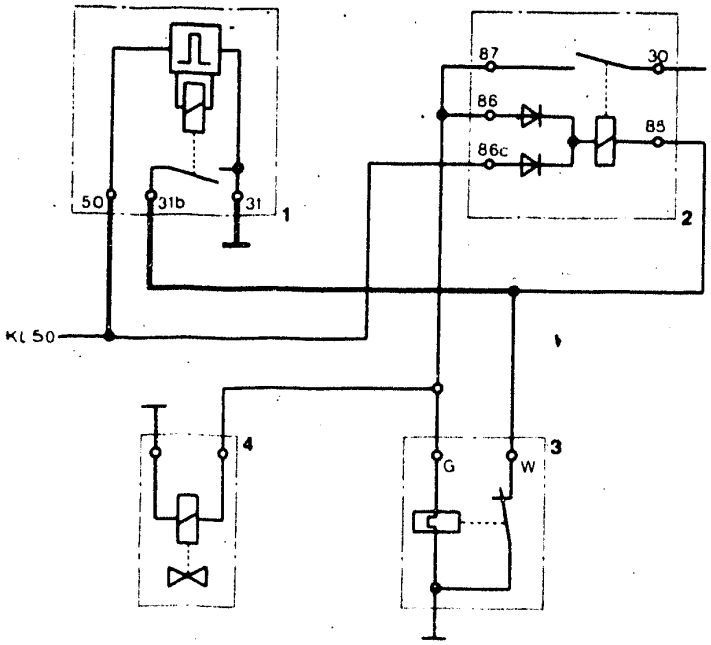
Timing relay 0 340 000 003 controls the start valve during hot starts. The start valve then injects extra fuel intermittently (sometimes cutting out completely.

The timing valve is fitted according to the wiring diagram (see reverse side). The fitting of this relay will be charged for.

After fitting the timing relay starting should be carried out as follows:

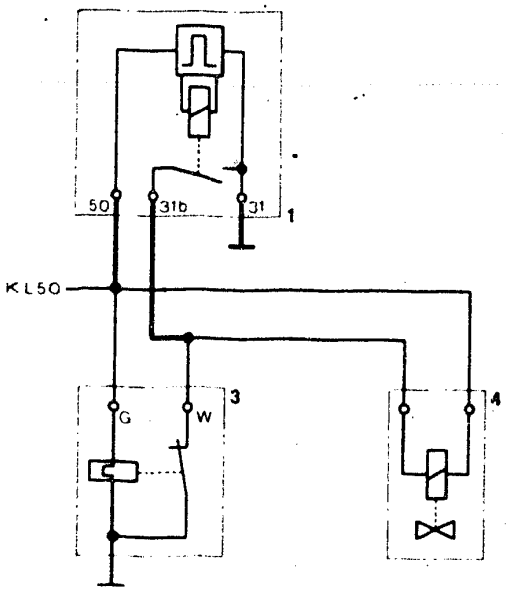
Vehicles with start valve in intake manifold - with open throttle valve,
Vehicles with start valve in idle duct - with closed throttle valve.

BOSCH Geschäftsbereich KH Kundendienst Kfz-Ausrüstung.



K-Jetronic system with post-injection relay

1 = Timing relay 0 340 000 003
2 = Post-injection relay
3 = Thermo-time switch
4 = Start valve



K-Jetronic system without post-injection relay

After-sales Service

Technical Bulletin

TUBE FITTING WITH FILTER IN WARM-UP REGULATOR 0 438 140 ...

VDT-I-438/106 En
4.1980

Warm-up regulator 0 438 140 065, used in MB 230 E, has a filter in the tube fitting for the fuel inlet to prevent dirt getting in.

When other warm-up regulators with the same connections give trouble or fail because of dirt getting in, then we recommend that you fit the new warm-up regulator with this tube fitting with filter, part no. 1 433 356 802.

During assembly a flat seal ring A 10 x 14 DIN 7603-C-CU, part no. 2 916 710 649, is laid underneath and the tube fitting is tightened with 20...22 Nm (2.0-2.2).

BOSCH Geschäftsbereich KH Kundendienst Kfz-Ausrüstung

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